SECTION 7 –

DOCUMENTATION

IN SUPPORT OF TEST CLAIMS IN RE SANTA ANA RWQCB

ORDER NO. R8-2009-0030

(NPDES NO. CAS618030)

VOLUME IV

MISCELLANEOUS AUTHORITIES

(Exhibits 13 – 18)

INDEX TO SECTION 7 DOCUMENTATION

VOLUMES III AND IV – MISCELLANEOUS AUTHORITIES

VOLUME III

DESCRIPTION OF AUTHORITY	EXH. NO.
EPA Guidance Memorandum, Subject: Establishing Total Maximum Daily Load (TMDL) Waste Load Allocations (WLAs) for Stormwater Sources and NPDES Permit Requirements Based On Those WLAs, November 22, 2002	1.
Letter dated August 22, 2003, from EPA Headquarters to the Honorable Bart Doyle	2.
TMDLs Stormwater Handbook, November, 2008	3.
Report issued for Congress by the National Research Council ("NRC") in 2001, entitled "*Assessing the TMDL Approach to Water Quality Management*"	4.
State Board Order No. 91-04	5.
State Board Order No. 96-13	6.
State Board Order No. 98-01	7.
State Board Order No. 2001-11	8.
State Board Order No. 2001-15	9.
State Board Order No. 2006-12	10.
Stormwater Quality Panel Recommendations to the California State Water Resources Control Board – *The Feasibility of Numeric Effluent Limits Applicable to Discharges of Stormwater Association with Municipal Industrial and Construction Activities*, June 19, 2006	11.
April 18, 2008 letter from State Board's Chief Counsel to Commission on State Mandates	12.
VOLUME IV	
California Toxics Rule ("CTR"), 65 Fed. Reg. 31682, *et seq*	13.
Excerpts of EPA's Responses to Comments to California Toxics Rule	14.

INDEX TO SECTION 7 DOCUMENTATION	
MISCELLANEOUS AUTHORITIES	
DOCUMENT	**EXH. NO.**
EPA's Economic Analysis of the California Toxic Rule, October 1999	15.
State Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays and Estuaries in California (State Implementation Plan)	16.
California Regional Water Quality Control Board (Santa Ana Region) Order No. R8-2010-0033 (January 29, 2010)	17.
San Diego Regional Board Staff Report re: *Comparison Between the Requirements of Tentative Order 2001-01, the Federal NPDES Storm Water Regulations, the Existing San Diego Municipal Storm Water Permit (Order 90-42), and Previous Drafts of the San Diego Municipal Storm Water Permit*	18.

EXHIBIT “13”

Federal Register

Thursday,
May 18, 2000

Part III

Environmental Protection Agency

40 CFR Part 131

Water Quality Standards; Establishment of Numeric Criteria for Priority Toxic Pollutants for the State of California; Rule

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 131

[FRL–6587–9]

RIN 2040–AC44

Water Quality Standards; Establishment of Numeric Criteria for Priority Toxic Pollutants for the State of California

AGENCY: Environmental Protection Agency.

ACTION: Final rule.

SUMMARY: This final rule promulgates: numeric aquatic life criteria for 23 priority toxic pollutants; numeric human health criteria for 57 priority toxic pollutants; and a compliance schedule provision which authorizes the State to issue schedules of compliance for new or revised National Pollutant Discharge Elimination System permit limits based on the federal criteria when certain conditions are met.

EPA is promulgating this rule based on the Administrator's determination that numeric criteria are necessary in the State of California to protect human health and the environment. The Clean Water Act requires States to adopt numeric water quality criteria for priority toxic pollutants for which EPA has issued criteria guidance, the presence or discharge of which could reasonably be expected to interfere with maintaining designated uses.

EPA is promulgating this rule to fill a gap in California water quality standards that was created in 1994 when a State court overturned the State's water quality control plans which contained water quality criteria for priority toxic pollutants. Thus, the State of California has been without numeric water quality criteria for many priority toxic pollutants as required by the Clean Water Act, necessitating this action by EPA. These Federal criteria are legally applicable in the State of California for inland surface waters, enclosed bays and estuaries for all purposes and programs under the Clean Water Act.

EFFECTIVE DATE: This rule shall be effective May 18, 2000.

ADDRESSES: The administrative record for today's final rule is available for public inspection at the U.S. Environmental Protection Agency, Region 9, Water Division, 75 Hawthorne Street, San Francisco, California 94105, between the hours of 8:00 a.m. and 4:30 p.m. For access to the administrative record, call Diane E. Fleck, P.E., Esq. at 415 744–1984 for an appointment. A reasonable fee will be charged for photocopies.

FOR FURTHER INFORMATION CONTACT: Diane E. Fleck, P.E., Esq. or Philip Woods, U.S. Environmental Protection Agency, Region 9, Water Division, 75 Hawthorne Street, San Francisco, California 94105, 415–744–1984 or 415–744–1997, respectively.

SUPPLEMENTARY INFORMATION: This preamble is organized according to the following outline:

A. Potentially Affected Entities
B. Introduction and Overview
1. Introduction
2. Overview
C. Statutory and Regulatory Background
D. California Water Quality Standards Actions
1. California Regional Water Quality Control Board Basin Plans, and the Inland Surface Waters Plan (ISWP) and the Enclosed Bays and Estuaries Plan (EBEP) of April 1991
2. EPA's Review of California Water Quality Standards for Priority Toxic Pollutants in the ISWP and EBEP, and the National Toxics Rule
3. Status of Implementation of CWA Section 303(c)(2)(B)
4. State-Adopted, Site-Specific Criteria for Priority Toxic Pollutants
a. State-Adopted Site-Specific Criteria Under EPA Review
b. State-Adopted Site-Specific Criteria With EPA Approval
E. Rationale and Approach For Developing the Final Rule
1. Legal Basis
2. Approach for Developing this Rule
F. Derivation of Criteria
1. Section 304(a) Criteria Guidance Process
2. Aquatic Life Criteria
a. Freshwater Acute Selenium Criterion
b. Dissolved Metals Criteria
c. Application of Metals Criteria
d. Saltwater Copper Criteria
e. Chronic Averaging Period
f. Hardness
3. Human Health Criteria
a. 2,3,7,8–TCDD (Dioxin) Criteria
b. Arsenic Criteria
c. Mercury Criteria
d. Polychlorinated Biphenyls (PCBs) Criteria
e. Excluded Section 304(a) Human Health Criteria
f. Cancer Risk Level
G. Description of Final Rule
1. Scope
2. EPA Criteria for Priority Toxic Pollutants
3. Implementation
4. Wet Weather Flows
5. Schedules of Compliance
6. Changes from Proposed Rule
H. Economic Analysis
1. Costs
2. Benefits
I. Executive Order 12866, Regulatory Planning and Review
J. Unfunded Mandates Reform Act of 1995
K. Regulatory Flexibility Act
L. Paperwork Reduction Act
M. Endangered Species Act
N. Congressional Review Act
O. Executive Order 13084, Consultation and Coordination With Indian Tribal Governments
P. National Technology Transfer and Advancement Act
Q. Executive Order 13132 on Federalism
R. Executive Order 13045 on Protection of Children From Environmental Health Risks and Safety Risks

A. Potentially Affected Entities

Citizens concerned with water quality in California may be interested in this rulemaking. Entities discharging pollutants to waters of the United States in California could be affected by this rulemaking since water quality criteria are used by the State in developing National Pollutant Discharge Elimination System (NPDES) permit limits. Categories and entities that ultimately may be affected include:

Category	Examples of potentially affected entities
Industry	Industries discharging pollutants to surface waters in California or to publicly-owned treatment works.
Municipalities	Publicly-owned treatment works discharging pollutants to surface waters in California

This table is not intended to be exhaustive, but rather provides a guide for readers regarding entities likely to be affected by this action. This table lists the types of entities that EPA is now aware could potentially be affected by this action. Other types of entities not listed in the table could also be affected. To determine whether your facility might be affected by this action, you should carefully examine the applicability criteria in § 131.38(c). If you have questions regarding the applicability of this action to a particular entity, consult the persons listed in the preceding **FOR FURTHER INFORMATION CONTACT** section.

B. Introduction and Overview

1. Introduction

This section introduces the topics which are addressed in the preamble and provides a brief overview of EPA's basis and rationale for promulgating Federal criteria for the State of California. Section C briefly describes the evolution of the efforts to control toxic pollutants; these efforts include the changes enacted in the 1987 CWA Amendments, which are the basis for this rule. Section D summarizes California's efforts since 1987 to implement the requirements of CWA section 303(c)(2)(B) and describes EPA's procedure and actions for determining whether California has fully implemented CWA section 303(c)(2)(B). Section E provides the rationale and approach for developing this final rule, including a discussion of EPA's legal basis for this final rule. Section F describes the development of the criteria included in this rule. Section G summarizes the provisions of the final rule and discusses implementation issues. Sections H, I, J, K , L, M, N, O, P, and Q briefly address the requirements of Executive Order 12866, the Unfunded Mandates Reform Act of 1995, the Regulatory Flexibility Act, the Paperwork Reduction Act, the Endangered Species Act, the Congressional Review Act, Executive Order 13084, Consultation and Coordination with Indian Tribal Governments, the National Technology Transfer and Advancement Act, and Executive Order 13132, Federalism, respectively.

The proposal for this rulemaking was published in the **Federal Register** on August 5, 1997. Changes from the proposal are generally addressed in the body of this preamble and specifically addressed in the response to comments document included in the administrative record for this rulemaking. EPA responded to all comments on the proposed rule, including comments received after the September 26, 1997, deadline. Although EPA is under no legal obligation to respond to late comments, EPA made a policy decision to respond to all comments.

Since detailed information concerning many of the topics in this preamble was published previously in the **Federal Register** in preambles for this and other rulemakings, references are frequently made to those preambles. Those rulemakings include: Water Quality Standards; Establishment of Numeric Criteria for Priority Toxic Pollutants for the State of California; Proposed Rule, 62 FR 42159, August 5, 1997 (referred to as the "proposed CTR"); Water Quality Standards; Establishment of Numeric Criteria for Priority Toxic Pollutants, 57 FR 60848, December 22, 1992 (referred to as the "National Toxics Rule" or "NTR"); and the NTR as amended by Administrative Stay of Federal Water Quality Criteria for Metals and Interim Final Rule, Water Quality Standards; Establishment of Numeric Criteria for Priority Toxic Pollutants; States' Compliance—Revision of Metals Criteria, 60 FR 22228, May 4, 1995 (referred to as the "National Toxics Rule [NTR], as amended"). The NTR, as amended, is codified at 40 CFR 131.36. A copy of the proposed CTR and its preamble, and the NTR, as amended, and its preambles are contained in the administrative record for this rulemaking.

EPA is making this final rule effective upon publication. Under the Administrative Procedure Act, 5 U.S.C. 553(d)(3), agencies must generally publish a rule no more than 30 days prior to the effective date of the rule except as otherwise provided for by the Agency for good cause. The purpose of the 30-day waiting period is to give affected parties a reasonable time to adjust their behavior before the final rule takes effect. See *Omnipoint Corp.* v. *F.C.C.*, 78 F.3d 620, 630–631 (D.C. Cir. 1996); *Riverbend Farms, Inc.* v. *Madigan*, 958 F.2d 1479, 1485 (9th Cir. 1992).

In this instance, EPA finds good cause to make the final rule effective upon publication. In order to find good cause, an Agency needs to find that the 30-day period would be: (1) Impracticable, (2) unnecessary, or (3) contrary to the public interest. Here EPA is relying on the second reason to support its finding of good cause. EPA also notes that the State has requested EPA to make the rule immediately effective.

EPA finds that in this instance, waiting 30 days to make the rule effective is unnecessary. As explained in further detail elsewhere in this preamble, this rule is not self implementing; rather it establishes ambient conditions that the State of California will implement in future permit proceedings. These permit proceedings will, by regulation, take longer than 30 days to complete. This means that although the rule is immediately effective, no discharger's conduct would be altered under the rule in less than 30 days, and therefore the 30-day period is unnecessary.

2. Overview

This final rule establishes ambient water quality criteria for priority toxic pollutants in the State of California. The criteria in this final rule will supplement the water quality criteria promulgated for California in the NTR, as amended. In 1991, EPA approved a number of water quality criteria (discussed in section D), for the State of California. Since EPA had approved these criteria, it was not necessary to include them in the 1992 NTR for these criteria. However, the EPA-approved criteria were subsequently invalidated in State litigation. Thus, this final rule contains criteria to fill the gap created by the State litigation.

This final rule does not change or supersede any criteria previously promulgated for the State of California in the NTR, as amended. Criteria which EPA promulgated for California in the NTR, as amended, are footnoted in the final table at 131.38(b)(1), so that readers may see the criteria promulgated in the NTR, as amended, for California and the criteria promulgated through this rulemaking for California in the same table. This final rule is not intended to apply to waters within Indian Country. EPA recognizes that there are possibly waters located wholly or partly in Indian Country that are included in the State's basin plans. EPA will work with the State and Tribes to identify any such waters and determine whether further action to protect water quality in Indian Country is necessary.

This rule is important for several environmental, programmatic and legal reasons. Control of toxic pollutants in surface waters is necessary to achieve the CWA's goals and objectives. Many of California's monitored river miles, lake acres, and estuarine waters have elevated levels of toxic pollutants. Recent studies on California water bodies indicate that elevated levels of toxic pollutants exist in fish tissue which result in fishing advisories or bans. These toxic pollutants can be attributed to, among other sources, industrial and municipal discharges.

Water quality standards for toxic pollutants are important to State and EPA efforts to address water quality problems. Clearly established water quality goals enhance the effectiveness of many of the State's and EPA's water programs including permitting, coastal water quality improvement, fish tissue quality protection, nonpoint source controls, drinking water quality protection, and ecological protection. Numeric criteria for toxic pollutants allow the State and EPA to evaluate the adequacy of existing and potential control measures to protect aquatic ecosystems and human health. Numeric criteria also provide a more precise basis for deriving water quality-based effluent limitations (WQBELs) in

National Pollutant Discharge Elimination System (NPDES) permits and wasteload allocations for total maximum daily loads (TMDLs) to control toxic pollutant discharges. Congress recognized these issues when it enacted section 303(c)(2)(B) to the CWA.

While California recognizes the need for applicable water quality standards for toxic pollutants, its adoption efforts have been stymied by a variety of factors. The Administrator has decided to exercise her CWA authorities to move forward the toxic control program, consistent with the CWA and with the State of California's water quality standards program.

Today's action will also help restore equity among the States. The CWA is designed to ensure all waters are sufficiently clean to protect public health and/or the environment. The CWA allows some flexibility and differences among States in their adopted and approved water quality standards, but it should be implemented in a manner that ensures a level playing field among States. Although California has made important progress toward satisfying CWA requirements, it has not satisfied CWA section 303(c)(2)(B) by adopting numeric water quality criteria for toxic pollutants. This section was added to the CWA by Congress in 1987. Prior to today, the State of California had been the only State in the Nation for which CWA section 303(c)(2)(B) had remained substantially unimplemented after EPA's promulgation of the NTR in December of 1992. Section 303(c)(4) of the CWA authorizes the EPA Administrator to promulgate standards where necessary to meet the requirements of the Act. The Administrator determined that this rule was a necessary and important component for the implementation of CWA section 303(c)(2)(B) in California.

EPA acknowledges that the State of California is working to satisfy CWA section 303(c)(2)(B). When the State formally adopts, and EPA approves, criteria consistent with statutory requirements, as envisioned by Congress in the CWA, EPA intends to stay this rule. If within the applicable time frame for judicial review, the States' standards are challenged, EPA will withdraw this rule after such judicial review is complete and the State standards are sustained.

C. Statutory and Regulatory Background

The preamble to the August 5, 1997, proposed rule provided a general discussion of EPA's statutory and regulatory authority to promulgate water quality criteria for the State of California. See 62 FR 42160–42163. EPA is including that discussion in the record for the final rule. Commenters questioned EPA's authority to promulgate certain aspects of the proposal. EPA is responding to those comments in the appropriate sections of this preamble, and in the response to comments document included in the administrative record for this rulemaking. Where appropriate, EPA's responses expand upon the discussion of statutory and regulatory authority found in the proposal.

D. California Water Quality Standards Actions

1. California Regional Water Quality Control Board Basin Plans, and the Inland Surface Waters Plan (ISWP) and the Enclosed Bays and Estuaries Plan (EBEP) of April 1991

The State of California regulates water quality through its State Water Resources Control Board (SWRCB) and through nine Regional Water Quality Control Boards (RWQCBs). Each of the nine RWQCBs represents a different geographic area; area boundaries are generally along watershed boundaries. Each RWQCB maintains a Basin Plan which contains the designated uses of the water bodies within its respective geographic area within California. These designated uses (or "beneficial uses" under State law) together with legally-adopted criteria (or "objectives" under State law), comprise water quality standards for the water bodies within each of the Basin areas. Each of the nine RWQCBs undergoes a triennial basin planning review process, in compliance with CWA section 303. The SWRCB provides assistance to the RWQCBs.

Most of the Basin Plans contain conventional pollutant objectives such as dissolved oxygen. None of the Basin Plans contains a comprehensive list of priority toxic pollutant criteria to satisfy CWA section 303(c)(2)(B). The nine RWQCBs and the SWRCB had intended that the priority toxic pollutant criteria contained in the three SWRCB statewide plans, the Inland Surface Waters Plan (ISWP), the Enclosed Bays and Estuaries Plan (EBEP), and the Ocean Plan, apply to all basins and satisfy CWA section 303(c)(2)(B).

On April 11, 1991, the SWRCB adopted two statewide water quality control plans, the ISWP and the EBEP. These statewide plans contained narrative and numeric water quality criteria for toxic pollutants, in part to satisfy CWA section 303(c)(2)(B). The water quality criteria contained in the SWRCB statewide plans, together with the designated uses in each of the Basin Plans, created a set of water quality standards for waters within the State of California.

Specifically, the two plans established water quality criteria or objectives for all fresh waters, bays and estuaries in the State. The plans contained water quality criteria for some priority toxic pollutants, provisions relating to whole effluent toxicity, implementation procedures for point and nonpoint sources, and authorizing compliance schedule provisions. The plans also included special provisions affecting waters dominated by reclaimed water (labeled as Category (a) waters), and waters dominated by agricultural drainage and constructed agricultural drains (labeled as Category (b) and (c) waters, respectively).

2. EPA's Review of California Water Quality Standards for Priority Toxic Pollutants in the ISWP and EBEP, and the National Toxics Rule

The EPA Administrator has delegated the responsibility and authority for review and approval or disapproval of all new or revised State water quality standards to the EPA Regional Administrators (see 40 CFR 131.21). Thus, State actions under CWA section 303(c)(2)(B) are submitted to the appropriate EPA Regional Administrator for review and approval.

In mid-April 1991, the SWRCB submitted to EPA for review and approval the two statewide water quality control plans, the ISWP and the EBEP. On November 6, 1991, EPA Region 9 formally concluded its review of the SWRCB's plans. EPA approved the narrative water quality criterion and the toxicity criterion in each of the plans. EPA also approved the numeric water quality criteria contained in both plans, finding them to be consistent with the requirements of section 303(c)(2)(B) of the CWA and with EPA's national criteria guidance published pursuant to section 304(a) of the CWA.

EPA noted the lack of criteria for some pollutants, and found that, because of the omissions, the plans did not fully satisfy CWA section 303(c)(2)(B). The plans did not contain criteria for all listed pollutants for which EPA had published national criteria guidance. The ISWP contained human health criteria for only 65 pollutants, and the EBEP contained human health criteria for only 61 pollutants for which EPA had issued section 304(a) guidance criteria. Both the ISWP and EBEP contained aquatic life criteria for all pollutants except cyanide and chromium III (freshwater only) for which EPA has CWA section

304(a) criteria guidance. The SWRCB's administrative record stated that all priority pollutants with EPA criteria guidance were likely to be present in California waters. However, the SWRCB's record contained insufficient information to support a finding that the excluded pollutants were not reasonably expected to interfere with designated uses of the waters of the State.

Although EPA approved the statewide selenium objective in the ISWP and EBEP, EPA disapproved the objective for the San Francisco Bay and Delta, because there was clear evidence that the objective would not protect the designated fish and wildlife uses (the California Department of Health Services had issued waterfowl consumption advisories due to selenium concentrations, and scientific studies had documented selenium toxicity to fish and wildlife). EPA restated its commitment to object to National Pollutant Discharge Elimination System (NPDES) permits issued for San Francisco Bay that contained effluent limits based on an objective greater than 5 parts per billion (ppb) (four day average) and 20 ppb (1 hour average), the freshwater criteria. EPA reaffirmed its disapproval of Californias' site-specific selenium objective for portions of the San Joaquin River, Salt Slough, and Mud Slough. EPA also disapproved of the categorical deferrals and exemptions. These disapprovals included the disapproval of the State's deferral of water quality objectives to effluent dominated streams (Category a) and to streams dominated by agricultural drainage (Category b), and the disapproval of the exemption of water quality objectives to constructed agricultural drains (Category c). EPA found the definitions of the categories imprecise and overly broad which could have led to an incorrect interpretation.

Since EPA had disapproved portions of each of the California statewide plans which were necessary to satisfy CWA section 303(c)(2)(B), certain disapproved aspects of California's water quality standards were included in EPA's promulgation of the National Toxics Rule (NTR) (40 CFR 131.36, 57 FR 60848). EPA promulgated specific criteria for certain water bodies in California.

The NTR was amended, effective April 14, 1995, to stay certain metals criteria which had been promulgated as total recoverable. Effective April 15, 1995, EPA promulgated interim final metals criteria as dissolved concentrations for those metals which had been stayed (Administrative Stay of Federal Water Quality Criteria for Metals and Interim Final Rule, Water Quality Standards; Establishment of Numeric Criteria for Priority Toxic Pollutants; States' Compliance—Revision of Metals Criteria; 60 FR 22228, 22229, May 4, 1995 [the NTR, as amended]). The stay was in response to a lawsuit against EPA challenging, among other issues, metals criteria expressed as total recoverable concentrations. A partial Settlement Agreement required EPA to stay specific metals criteria in the NTR. EPA then promulgated certain metals criteria in the dissolved form through the use of conversion factors. These factors are listed in the NTR, as amended. A scientific discussion of these criteria is found in a subsequent section of this preamble.

Since certain criteria have already been promulgated for specific water bodies in the State of California in the NTR, as amended, they are not within the scope of today's final rule. However, for clarity in reading a comprehensive rule for the State of California, these criteria are incorporated into 40 CFR 131.38(d)(2). Footnotes to the Table in 40 CFR 131.38(b)(1) and 40 CFR 131.38(d)(3) clarify which criteria (and for which specific water bodies) were promulgated by the NTR, as amended, and are therefore excluded from this final rule. The appropriate (freshwater or saltwater) aquatic life criteria which were promulgated in the NTR, as amended, for all inland surface waters and enclosed bays and estuaries include: chromium III and cyanide. The appropriate (water and organism or organism only) human health criteria which were promulgated in the NTR, as amended, for all inland surface waters and enclosed bays and estuaries include:

antimony
thallium
asbestos
acrolein
acrylonitrile
carbon tetrachloride
chlorobenzene
1,2-dichloroethane
1,1-dichloroethylene
1,3-dichloropropylene
ethylbenzene
1,1,2,2-tetrachloroethane
tetrachloroethylene
1,1,2-trichloroethane
trichloroethylene
vinyl chloride
2,4-dichlorophenol
2-methyl-4,6-dinitrophenol
2,4-dinitrophenol
benzidine
bis(2-chloroethyl)ether
bis(2-ethylhexyl)phthalate
3,3-dichlorobenzidine
diethyl phthalate
dimethyl phthalate
di-n-butyl phthalate
2,4-dinitrotoluene
1,2-diphenylhydrazine
hexachlorobutadiene
hexachlorocyclopentadiene
hexachloroethane
isophorone
nitrobenzene
n-nitrosodimethylamine
n-nitrosodiphenylamine

Other pollutant criteria were promulgated in the NTR, as amended, for specific water bodies, but not all inland surface waters and enclosed bays and estuaries.

3. Status of Implementation of CWA Section 303(c)(2)(B)

Shortly after the SWRCB adopted the ISWP and EBEP, several dischargers filed suit against the State alleging that it had not adopted the two plans in compliance with State law. The plaintiffs in a consolidated case included: the County of Sacramento, Sacramento County Water Agency; Sacramento Regional County Sanitation District; the City of Sacramento; the City of Sunnyvale; the City of San Jose; the City of Stockton; and Simpson Paper Company.

The dischargers alleged that the State had not adopted the ISWP and EBEP in compliance with the California Administrative Procedures Act (Gov Code. Section 11340, *et seq.*), the California Environmental Quality Act (Pub. Re Code, Section 21000, *et seq.*), and the Porter-Cologne Act (Wat. Code, Section 13200, *et seq.*). The allegation that the State did not sufficiently consider economics when adopting water quality objectives, as allegedly required by Section 13241 of the Porter Cologne Act, was an important issue in the litigation.

In October of 1993, the Superior Court of California, County of Sacramento, issued a tentative decision in favor of the dischargers. In March of 1994, the Court issued a substantively similar final decision in favor of the dischargers. Final judgments from the Court in July of 1994 ordered the SWRCB to rescind the ISWP and EBEP. On September 22, 1994, the SWRCB formally rescinded the two statewide water quality control plans. The State is currently in the process of readopting water quality control plans for inland surface waters, enclosed bays and estuaries.

CWA section 303(c)(2)(B) was fully implemented in the State of California from December of 1992, when the NTR was promulgated, until September of 1994, when the SWRCB was required to rescind the ISWP and EBEP. The provisions for California in EPA's NTR together with the approved portions of

California's ISWP and EBEP implemented the requirements of CWA section 303(c)(2)(B). However, since September of 1994, when the SWRCB rescinded the ISWP and EBEP, the requirements of section 303(c)(2)(B) have not been fully implemented in California.

The scope of today's rule is to re-establish criteria for the remaining priority toxic pollutants to meet the requirements of section 303(c)(2)(B) of the CWA. Pursuant to section 303(c)(4), the Administrator has determined that it is necessary to include in today's action criteria for priority toxic pollutants, which are not covered by the NTR, as amended, or by the State through EPA-approved site-specific criteria, for waters of the United States in the State of California.

4. State-Adopted, Site-Specific Criteria for Priority Toxic Pollutants

The State has the discretion to develop site-specific criteria when appropriate e.g., when statewide criteria appear over-or under-protective of designated uses. Periodically, the State through its RWQCBs will adopt site-specific criteria for priority toxic pollutants within respective Basin Plans. These criteria are intended to be effective throughout the Basin or throughout a designated water body. Under California law, these criteria must be publicly reviewed and approved by the RWQCB, the SWRCB, and the State's Office of Administrative Law (OAL). Once this adoption process is complete, the criteria become State law.

These criteria must be submitted to the EPA Regional Administrator for review and approval under CWA section 303. These criteria are usually submitted to EPA as part of a RWQCB Basin Plan Amendment, after the Amendment has been adopted under the State's process and has become State law.

a. State-Adopted Site-Specific Criteria Under EPA Review

The State of California has recently reviewed and updated all of its RWQCB Basin Plans. All of the Basin Plans have completed the State review and adoption process and have been submitted to EPA for review and approval. Some of the Basin Plans contain site-specific criteria. In these cases, the State-adopted site-specific criteria are used for water quality programs.

EPA has not yet concluded consultation under the Endangered Species Act with the U.S. Department of Interior, Fish and Wildlife Service, and the U.S. Department of Commerce, National Marine Fisheries Service, on EPA's tentative approval/disapproval actions on the RWQCB Basin Plans. In this situation, the more stringent of the two criteria (the State-adopted site-specific criteria in the RWQCB Basin Plans, or the Federal criteria in this final rule), would be used for water quality programs including the calculation of water quality-based effluent criteria in National Pollutant Discharge Elimination System (NPDES) permits.

b. State-Adopted Site-Specific Criteria With EPA Approval

In several cases, the EPA Regional Administrator has already reviewed and approved State-adopted site-specific criteria within the State of California. Several of these cases are discussed in this section. All of the EPA approval letters referenced in today's preamble are contained in the administrative record for today's rule.

Sacramento River: EPA has approved site-specific acute criteria for copper, cadmium and zinc in the Sacramento River, upstream of Hamilton City, in the Central Valley Region (RWQCB for the Central Valley Region) of the State of California. EPA approved these site-specific criteria by letter dated August 7, 1985. Specifically, EPA approved for the Sacramento River (and tributaries) above Hamilton City, a copper criterion of 5.6 µg/l (maximum), a zinc criterion of 16 µg/l (maximum) and a cadmium criterion of 0.22 µg/l (maximum), all in the dissolved form using a hardness of 40 mg/l as CaCO3. (These criteria were actually adopted by the State and approved by EPA as equations which vary with hardness.) These "maximum" criteria correspond to acute criteria in today's final rule. Therefore, Federal acute criteria for copper, cadmium, and zinc for the Sacramento River (and tributaries) above Hamilton City are not necessary to protect the designated uses and are not included in the final rule. However, the EPA Administrator is making a finding that it is necessary to include chronic criteria for copper, cadmium and zinc for the Sacramento River (and tributaries) above Hamilton City, as part of the statewide criteria promulgated in today's final rule.

San Joaquin River: The selenium criteria in this rule are not applicable to portions of the San Joaquin River, in the Central Valley Region, because selenium criteria have been either previously approved by EPA or previously promulgated by EPA as part of the NTR. EPA approved and disapproved State-adopted site-specific selenium criteria in portions of the San Joaquin River, in the Central Valley Region of the State of California (RWQCB for the Central Valley Region). EPA's determination on these site-specific criteria is contained in a letter dated April 13, 1990.

Specifically, EPA approved for the San Joaquin River, mouth of Merced River to Vernalis, an aquatic life selenium criterion of 12 µg/l (maximum with the understanding that the instantaneous maximum concentration may not exceed the objective more than once every three years). Today's final rule does not affect this Federally-approved, State-adopted site-specific acute criterion, and it remains in effect for the San Joaquin River, mouth of Merced River to Vernalis. Therefore, an acute criterion for selenium in the San Joaquin River, mouth of Merced River to Vernalis is not necessary to protect the designated use and thus is not included in this final rule.

By letter dated April 13, 1990, EPA also approved for the San Joaquin River, mouth of Merced River to Vernalis, a State-adopted site-specific aquatic life selenium criterion of 5 µg/l (monthly mean); however, EPA disapproved a State-adopted site-specific selenium criterion of 8 µg/l (monthly mean—critical year only) for these waters. Subsequently, EPA promulgated a chronic selenium criterion of 5 µg/l (4 day average) for waters of the San Joaquin River from the mouth of the Merced River to Vernalis in the NTR. This chronic criterion applies to all water quality programs concerning the San Joaquin River, mouth of Merced River to Vernalis. Today's final rule does not affect the Federally-promulgated chronic selenium criterion of 5 µg/l (4 day average) set forth in the NTR. This previously Federally-promulgated criterion remains in effect for the San Joaquin River, mouth of Merced River to Vernalis.

Grassland Water District, San Luis National Wildlife Refuge, and Los Banos State Wildlife Refuge: EPA approved for the Grassland Water District, San Luis National Wildlife Refuge, and Los Banos State Wildlife Refuge, a State-adopted site-specific aquatic life selenium criterion of 2 µg/l (monthly mean) by letter dated April 13, 1990. This Federally-approved, State-adopted site-specific chronic criterion remains in effect for the Grassland Water District, San Luis National Wildlife Refuge and Los Banos State Wildlife Refuge. Therefore it is not necessary to include in today's final rule, a chronic criterion for selenium for the Grassland Water District, San Luis National Wildlife Refuge and Los Banos State Wildlife Refuge, and thus, it is not included in this final rule.

San Francisco Regional Board Basin Plan of 1986: EPA approved several priority toxic pollutant objectives (CWA criteria) that were contained in the1986 San Francisco Regional Board Basin Plan, as amended by SWRCB Resolution Numbers 87–49, 87–82 and 87–92, by letters dated September 2, 1987 and December 24, 1987. This Basin Plan, the SWRCB Resolutions, and the EPA approval letters are contained in the administrative record for this rulemaking. It is not necessary to include these criteria for priority toxic pollutants that are contained in the San Francisco Regional Board's 1986 Basin Plan as amended, and approved by EPA. Priority pollutants in this situation are footnoted in the matrix at 131.38(b)(1) with footnote "b." Where gaps exist in the State adoption and EPA approval of priority toxic pollutant objectives, the criteria in today's rule apply.

EPA is assigning "human health, water and organism consumption" criteria to waters with the States' municipal or "MUN" beneficial use designation in the Basin Plan. Also, some pollutants regulated through the Basin Plan have different averaging periods, *e.g.,* one hour as compared with the rule's "short-term." However, where classes of chemicals, such as polynuclear aromatic hydrocarbons, or PAHs, and phenols, are regulated through the Basin Plan, but not specific chemicals within the category, specific chemicals within the category are regulated by today's rule.

E. Rationale and Approach for Developing the Final Rule

This section explains EPA's legal basis for today's final rule, and discusses EPA's general approach for developing the specific requirements for the State of California.

1. Legal Basis

CWA section 303(c) specifies that adoption of water quality standards is primarily the responsibility of the States. However, CWA section 303(c) also describes a role for the Federal government to oversee State actions to ensure compliance with CWA requirements. If EPA's review of the States' standards finds flaws or omissions, then the CWA authorizes EPA to correct the deficiencies (see CWA section 303(c)(4)). This water quality standards promulgation authority has been used by EPA to issue final rules on several separate occasions, including the NTR, as amended, which promulgated criteria similar to those included here for a number of States. These actions have addressed both insufficiently protective State criteria and/or designated uses and failure to adopt needed criteria. Thus, today's action is not unique.

The CWA in section 303(c)(4) provides two bases for promulgation of Federal water quality standards. The first basis, in paragraph (A), applies when a State submits new or revised standards that EPA determines are not consistent with the applicable requirements of the CWA. If, after EPA's disapproval, the State does not amend its rules so as to be consistent with the CWA, EPA is to promptly propose appropriate Federal water quality standards for that State. The second basis for an EPA action is in paragraph (B), which provides that EPA shall promptly initiate promulgation "* * * in any case where the Administrator determines that a revised or new standard is necessary to meet the requirements of this Act." EPA is using section 303(c)(4)(B) as the legal basis for today's final rule.

As discussed in the preamble to the NTR, the Administrator's determination under CWA section 303(c)(4) that criteria are necessary to meet the requirements of the Act could be supported in several ways. Consistent with EPA's approach in the NTR, EPA interprets section 303(c)(2)(B) of the CWA to allow EPA to act where the State has not succeeded in establishing numeric water quality standards for toxic pollutants. This inaction can be the basis for the Administrator's determination under section 303(c)(4) that new or revised criteria are necessary to ensure designated uses are protected.

EPA does not believe that it is necessary to support the criteria in today's rule on a pollutant-specific, water body-by-water-body basis. For EPA to undertake an effort to conduct research and studies of each stream segment or water body across the State of California to demonstrate that for each toxic pollutant for which EPA has issued CWA section 304(a) criteria guidance there is a "discharge or presence" of that pollutant which could reasonably "be expected to interfere with" the designated use would impose an enormous administrative burden and would be contrary to the statutory directive for swift action manifested by the 1987 addition of section 303(c)(2)(B) to the CWA. Moreover, because these criteria are ambient criteria that define attainment of the designated uses, their application to all water bodies will result in additional controls on dischargers only where necessary to protect the designated uses.

EPA's interpretation of section 303(c)(2)(B) is supported by the language of the provision, the statutory framework and purpose of section 303, and the legislative history. In adding section 303(c)(2)(B) to the CWA, Congress understood the existing requirements in section 303(c)(1) for States to conduct triennial reviews of their water quality standards and submit the results of those reviews to EPA and in section 303(c)(4)(B) for promulgation. CWA section 303(c) includes numerous deadlines and section 303(c)(4) directs the Administrator to act "promptly" where the Administrator determines that a revised or new standard is necessary to meet the requirements of the Act. Congress, by linking section 303(c)(2)(B) to the section 303(c)(1) three-year review period, gave States a last chance to correct this deficiency on their own. The legislative history of the provision demonstrates that chief Senate sponsors, including Senators Stafford, Chaffee and others wanted the provision to eliminate State and EPA delays and force quick action. Thus, to interpret CWA section 303(c)(2)(B) and (c)(4) to require such a cumbersome pollutant specific effort on each stream segment would essentially render section 303(c)(2)(B) meaningless. The provision and its legislative background indicate that the Administrator's determination to invoke section 303(c)(4)(B) authority can be met by the Administrator making a generic finding of inaction by the State without the need to develop pollutant specific data for individual stream segments. Finally, the reference in section 303(c)(2)(B) to section 304(a) criteria suggests that section 304(a) criteria serve as default criteria; that once EPA has issued them, States were to adopt numeric criteria for those pollutants based on the 304(a) criteria, unless they had other scientifically defensible criteria. EPA also notes that this rule follows the approach EPA took nationally in promulgating the NTR for States that failed to comply with CWA section 303(c)(2)(B). 57 FR 60848, December 22, 1992. EPA incorporates the discussion in the NTR preamble as part of this rulemaking record.

This determination is supported by information in the rulemaking record showing the discharge or presence of priority toxic pollutants throughout the State. While this data is not necessarily complete, it constitutes a strong record supporting the need for numeric criteria for priority toxic pollutants with section 304(a) criteria guidance where the State does not have numeric criteria.

Today's final rule would not impose any undue or inappropriate burden on the State of California or its dischargers. It merely puts in place numeric criteria

for toxic pollutants that are already used in other States in implementing CWA programs. Under this rulemaking, the State of California retains the ability to adopt alternative water quality criteria simply by completing its criteria adoption process. Upon EPA approval of those criteria, EPA will initiate action to stay the Federally-promulgated criteria and subsequently withdraw them.

2. Approach for Developing This Rule

In summary, EPA developed the criteria promulgated in today's final rule as follows. Where EPA promulgated criteria for California in the NTR, EPA has not acted to amend the criteria in the NTR. Where criteria for California were not included in the NTR, EPA used section 304(a) National criteria guidance documents as a starting point for the criteria promulgated in this rule. EPA then determined whether new information since the development of the national criteria guidance documents warranted any changes. New information came primarily from two sources. For human health criteria, new or revised risk reference doses and cancer potency factors on EPA's Integrated Risk Information System (IRIS) as of October 1996 form the basis for criteria values (see also 63 FR 68354). For aquatic life criteria, updated data sets resulting in revised criteria maximum concentrations (CMCs) and criteria continuous concentrations (CCCs) formed the basis for differences from the national criteria guidance documents. Both of these types of changes are discussed in more detail in the following sections. This revised information was used to develop the water quality criteria promulgated here for the State of California.

F. Derivation of Criteria

1. Section 304(a) Criteria Guidance Process

Under CWA section 304(a), EPA has developed methodologies and specific criteria guidance to protect aquatic life and human health. These methodologies are intended to provide protection for all surface waters on a national basis. The methodologies have been subject to public review, as have the individual criteria guidance documents. Additionally, the methodologies have been reviewed by EPA's Science Advisory Board (SAB) of external experts.

EPA has included in the record of this rule the aquatic life methodology as described in "Appendix B—Guidelines for Deriving Water Quality Criteria for the Protection of Aquatic Life and Its Uses" to the "Water Quality Criteria Documents; Availability" (45 FR 79341, November 28, 1980) as amended by the "Summary of Revisions to Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses" (50 FR 30792, July 29, 1985). (**Note:** Throughout the remainder of this preamble, this reference is described as the 1985 Guidelines. Any page number references are to the actual guidance document, not the notice of availability in the **Federal Register**. A copy of the 1985 Guidelines is available through the National Technical Information Service (PB85–227049), is in the administrative record for this rule, and is abstracted in Appendix A of *Quality Criteria for Water,* 1986.) EPA has also included in the administrative record of this rule the human health methodology as described in "Appendix C—Guidelines and Methodology Used in the Preparation of Health Effects Assessment Chapters of the Consent Decree Water Criteria Documents" (45 FR 79347, November 28, 1980). (Note: Throughout the remainder of this preamble, this reference is described as the Human Health Guidelines or the 1980 Guidelines.) EPA also recommends that the following be reviewed: "Appendix D—Response to Comments on Guidelines for Deriving Water Quality Criteria for the Protection of Aquatic Life and Its Uses," (45 FR 79357, November 28, 1980); "Appendix E—Responses to Public Comments on the Human Health Effects Methodology for Deriving Ambient Water Quality Criteria" (45 FR 79368, November 28, 1980); and "Appendix B—Response to Comments on Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses" (50 FR 30793, July 29, 1985). EPA placed into the administrative record for this rulemaking the most current individual criteria guidance for the priority toxic pollutants included in today's rule. (**Note:** All references to appendices are to the associated **Federal Register** publication.)

EPA received many comments related to the issue of what criteria should apply in the CTR if the CWA section 304(a) criteria guidance is undergoing re-evaluation, or if new data are developed that may affect a recommended criterion. As science is always evolving, EPA is faced with the challenge of promulgating criteria that reflect the best science and sound science. EPA addressed this challenge in some detail in its **Federal Register** notice that contained the Agency's current section 304(a) criteria guidance (63 FR 68335, December 10, 1998). There, EPA articulated its policy, reiterated here, that the existing criteria guidance represent the Agency's best assessment until such time as EPA's re-evaluation of a criteria guidance value for a particular chemical is complete. The reason for this is that both EPA's human health criteria guidance and aquatic life criteria guidance are developed taking into account numerous variables. For example, for human health criteria guidance, EPA evaluates many diverse toxicity studies, whose results feed into a reference dose or cancer potency estimate that, along with a number of exposure factors and determination of risk level, results in a guidance criterion. For aquatic life, EPA evaluates many diverse aquatic toxicity studies to determine chronic and acute toxicity taking into account how other factors (such as pH, temperature or hardness) affect toxicity. EPA also, to the extent possible, addresses bioaccumulation or bioconcentration. EPA then uses this toxicity information along with exposure information to determine the guidance criterion. Importantly, EPA subjects such evaluation to peer review and/or public comment.

For these reasons, EPA generally does not make a change to the 304(a) criteria guidance based on a partial picture of the evolving science. This makes sense, because to address one piece of new data without looking at all relevant data is less efficient and results in regulatory impacts that may go back and forth, when in the end, the criteria guidance value does not change that much. Certain new changes, however, do warrant change in criteria guidance, such as a change in a value in EPA's Integrated Risk Information System (IRIS) because it represents the Agency consensus about human health impacts. These changes are sufficiently examined across the Agency such that EPA believes they can be incorporated into EPA's water quality criteria guidance. EPA has followed this approach in the CTR. Included in the administrative record for today's rule is a document entitled "Status of Clean Water Act Section 304(a) Criteria" which further explains EPA's policy on managing change to criteria guidance.

2. Aquatic Life Criteria

Aquatic life criteria may be expressed in numeric or narrative form. EPA's 1985 Guidelines describe an objective, internally consistent and appropriate way of deriving chemical-specific, numeric water quality criteria for the protection of the presence of, as well as

the uses of, both fresh and salt water aquatic organisms.

An aquatic life criterion derived using EPA's CWA section 304(a) method "might be thought of as an estimate of the highest concentration of a substance in water which does not present a significant risk to the aquatic organisms in the water and their uses." (45 FR 79341.) EPA's guidelines are designed to derive criteria that protect aquatic communities. EPA's 1985 Guidelines attempt to provide a reasonable and adequate amount of protection with only a small possibility of substantial overprotection or underprotection. As discussed in detail below, there are several individual factors which may make the criteria somewhat overprotective or underprotective. The approach EPA is using is believed to be as well balanced as possible, given the state of the science.

Numerical aquatic life criteria derived using EPA's 1985 Guidelines are expressed as short-term and long-term averages, rather than one number, in order that the criterion more accurately reflect toxicological and practical realities. The combination of a criterion maximum concentration (CMC), a short-term concentration limit, and a criterion continuous concentration (CCC), a four-day average concentration limit, are designed to provide protection of aquatic life and its uses from acute and chronic toxicity to animals and plants, without being as restrictive as a one-number criterion would have to be (1985 Guidelines, pages 4 & 5). The terms CMC and CCC are the formal names for the two (acute and chronic) values of a criterion for a pollutant; however, this document will also use the informal synonyms acute criterion and chronic criterion.

The two-number criteria are intended to identify average pollutant concentrations which will produce water quality generally suited to maintenance of aquatic life and designated uses while restricting the duration of excursions over the average so that total exposures will not cause unacceptable adverse effects. Merely specifying an average value over a time period may be insufficient unless the time period is short, because excursions higher than the average may kill or cause substantial damage in short periods.

A minimum data set of eight specified families is recommended for criteria development (details are given in the 1985 Guidelines, page 22). The eight specific families are intended to be representative of a wide spectrum of aquatic life. For this reason it is not necessary that the specific organisms tested be actually present in the water body. EPA's application of its guidelines to develop the criteria matrix in this rule is judged by the Agency to be appropriate for all waters of the United States (U.S.), and to all ecosystems (1985 Guidelines, page 4) including those waters of the U.S. and ecosystems in the State of California.

Fresh water and salt water (including both estuarine and marine waters) have different chemical compositions, and freshwater and saltwater species often do not inhabit the same water. To provide additional accuracy, criteria are developed for fresh water and for salt water.

For this rule, EPA updated freshwater aquatic life criteria contained in CWA section 304(a) criteria guidance first published in the early 1980's and later modified in the NTR, as amended, for the following ten pollutants: arsenic, cadmium, chromium (VI), copper, dieldrin, endrin, lindane (gamma BHC), nickel, pentachlorophenol, and zinc. The updates used as the basis for this rule are explained in a technical support document entitled, *1995 Updates: Water Quality Criteria Documents for the Protection of Aquatic Life in Ambient Water* (U.S. EPA–820–B–96–001, September 1996), available in the administrative record to this rulemaking; this document presents the derivation of each of the final CMCs and CCCs and the toxicity studies from which the updated freshwater criteria for the ten pollutants were derived.

The polychlorinated biphenyls (PCB) criteria in the criteria matrix for this rule differs from that in the NTR, as amended; for this rule, the criteria are expressed as the sum of seven aroclors, while for the NTR, as amended, the criteria are expressed for each of seven aroclors. The aquatic life criteria for PCBs in the CTR are based on the criteria contained in the 1980 criteria guidance document for PCBs which is included in the administrative record for this rule. This criteria document explains the derivation of aquatic life criteria based on total PCBs. For more information see the Response to Comments document for this rule. Today's chronic aquatic life criteria for PCBs are based on a final residue value (FRV). In EPA's guidelines for deriving aquatic life criteria, an FRV-based criterion is intended to prevent concentrations of pollutants in commercially or recreationally important aquatic species from affecting the marketability of those species or affecting the wildlife that consume aquatic life.

The proposed CTR included an updated freshwater and saltwater aquatic life criteria for mercury. In today's final rule, EPA has reserved the mercury criteria for freshwater and saltwater aquatic life, but is promulgating human health criteria for mercury for all surface waters in California. In some instances, the human health mercury criteria included in today's final rule may not protect some aquatic species or threatened or endangered species. In such instances, more stringent mercury limits may be determined and implemented through use of the State's narrative criterion. The reasons for reserving the mercury aquatic life numbers are explained in further detail in Section L, Endangered Species Act.

a. Freshwater Acute Selenium Criterion

EPA proposed a different freshwater acute aquatic life criterion for selenium for this rule than was promulgated in the NTR, as amended. EPA's proposed action was consistent with EPA's proposed selenium criterion maximum concentration for the Water Quality Guidance for the Great Lakes System (61 FR 58444, November 14, 1996). This proposal took into account data showing that selenium's two most prevalent oxidation states, selenite and selenate, present differing potentials for aquatic toxicity, as well as new data which indicated that various forms of selenium are additive. Additivity increases the toxicity of mixtures of different forms of the pollutant. The proposed approach produces a different selenium acute criterion concentration, or CMC, depending upon the relative proportions of selenite, selenate, and other forms of selenium that are present.

The preamble to the August 5, 1997, proposed rule provided a lengthy discussion of this proposed criterion for the State of California. See 62 FR 42160–42208. EPA incorporates that discussion here as part of this rulemaking record. In 1996, a similar discussion was included in the proposed rule for the Great Lakes System. Commenters questioned several aspects of the Great Lakes proposal. EPA is continuing to respond to those comments, and to follow up with additional literature review and toxicity testing. In addition, the U.S. FWS and U.S. NMFS (collectively, the Services) are concerned that EPA's proposed criterion may not be sufficiently protective of certain threatened and endangered species in California. Because the Services believe there is a lack of data to show for certain that the proposed criterion would not affect threatened and endangered species, the Services prefer that EPA further investigate the protectiveness of the

criterion before finalizing the proposed criterion. Therefore, EPA is not promulgating a final acute freshwater selenium criterion at this time.

b. Dissolved Metals Criteria

In December of 1992, in the NTR, EPA promulgated water quality criteria for several States that had failed to meet the requirements of CWA section 303(c)(2)(B). Included among the water quality criteria promulgated were numeric criteria for the protection of aquatic life for 11 metals: arsenic, cadmium, chromium (III), chromium (VI), copper, lead, mercury, nickel, selenium, silver and zinc. Criteria for two metals applied to the State of California: chromium III and selenium.

The Agency received extensive public comment during the development of the NTR regarding the most appropriate approach for expressing the aquatic life metals criteria. The principal issue was the correlation between metals that are measured and metals that are bioavailable and toxic to aquatic life. It is now the Agency's policy that the use of dissolved metal to set and measure compliance with aquatic life water quality standards is the recommended approach, because dissolved metal more closely approximates the bioavailable fraction of the metal in the water column than does total recoverable metal.

Since EPA's previous aquatic life criteria guidance had been expressed as total recoverable metal, to express the criteria as dissolved, conversion factors were developed to account for the possible presence of particulate metal in the laboratory toxicity tests used to develop the total recoverable criteria. EPA included a set of recommended freshwater conversion factors with its Metals Policy (see Office of Water Policy and Technical Guidance on Interpretation and Implementation of Aquatic Life Metals Criteria, Martha G. Prothro, Acting Assistant Administrator for Water, October 1, 1993). Based on additional laboratory evaluations that simulated the original toxicity tests, EPA refined the procedures used to develop freshwater conversion factors for aquatic life criteria. These new conversion factors were made available for public review and comment in the amendments to the NTR on May 4, 1995, at 60 FR 22229. They are also contained in today's rule at 40 CFR 131.38(b)(2).

The preamble to the August 5, 1997, proposed rule provided a more detailed discussion of EPA's metals policy concerning the aquatic life water quality criteria for the State of California. See 62 FR 42160–42208. EPA incorporates that discussion here as part of this rulemaking record. Many commenters strongly supported the Agency's policy on dissolved metals aquatic life criteria. A few commenters expressed an opinion that the metals policy may not provide criteria that are adequately protective of aquatic or other species. Responses to those comments are contained in a memo to the CTR record entitled "Discussion of the Use of Dissolved Metals in the CTR" (February 1, 2000, Jeanette Wiltse) and EPA's response to comments document which are both contained in the administrative record for the final rule.

Calculation of Aquatic Life Dissolved Metals Criteria: Metals criteria values for aquatic life in today's rule in the matrix at 131.38(b)(1) are shown as dissolved metal. These criteria have been calculated in one of two ways. For freshwater metals criteria that are hardness-dependent, the metals criteria value is calculated separately for each hardness using the table at 40 CFR 131.38(b)(2). (The hardness-dependent freshwater values presented in the matrix at 40 CFR 131.38(b)(1) have been calculated using a hardness of 100 mg/l as $CaCO_3$ for illustrative purposes only.) The hardness-dependent criteria are then multiplied by the appropriate conversion factors in the table at 40 CFR 131.38(b)(2). Saltwater and freshwater metals criteria that are not hardness-dependent are calculated by taking the total recoverable criteria values (from EPA's national section 304(a) criteria guidance, as updated and described in section F.2.a.) before rounding, and multiplying them by the appropriate conversion factors. The final dissolved metals criteria values, as they appear in the matrix at 40 CFR 131.38(b)(1), are rounded to two significant figures.

Translators for Dissolved to Total Recoverable Metals Limits: EPA's National Pollutant Discharge Elimination System (NPDES) regulations require that limits for metals in permits be stated as total recoverable in most cases (see 40 CFR 122.45(c)) except when an effluent guideline specifies the limitation in another form of the metal, the approved analytical methods measure only dissolved metal, or the permit writer expresses a metal's limit in another form (*e.g.*, dissolved, specific valence, or total) when required to carry out provisions of the CWA. This is because the chemical conditions in ambient waters frequently differ substantially from those in the effluent and these differences result in changes in the partitioning between dissolved and absorbed forms of the metal. This means that if effluent limits were expressed in the dissolved form, additional particulate metal could dissolve in the receiving water causing the criteria to be exceeded. Expressing criteria as dissolved metal requires translation between different metal forms in the calculation of the permit limit so that a total recoverable permit limit can be established that will achieve water quality standards. Thus, it is important that permitting authorities and other authorities have the ability to translate between dissolved metal in ambient waters and total recoverable metal in effluent.

EPA has completed guidance on the use of translators to convert from dissolved metals criteria to total recoverable permit limits. The document, *The Metals Translator: Guidance for Calculating a Total Recoverable Permit Limit From a Dissolved Criterion* (EPA 823–B–96–007, June 1996), is included in the administrative record for today's rule. This technical guidance examines how to develop a metals translator which is defined as the fraction of total recoverable metal in the downstream water that is dissolved, *i.e.*, the dissolved metal concentration divided by the total recoverable metal concentration. A translator may take one of three forms: (1) It may be assumed to be equivalent to the criteria guidance conversion factors; (2) it may be developed directly as the ratio of dissolved to total recoverable metal; and (3) it may be developed through the use of a partition coefficient that is functionally related to the number of metal binding sites on the adsorbent in the water column (*e.g.*, concentrations of total suspended solids or TSS). This guidance document discusses these three forms of translators, as well as field study designs, data generation and analysis, and site-specific study plans to generate site-specific translators.

California Regional Water Quality Control Boards may use any of these methods in developing water quality-based permit limits to meet water quality standards based on dissolved metals criteria. EPA encourages the State to adopt a statewide policy on the use of translators so that the most appropriate method or methods are used consistently within California.

c. Application of Metals Criteria

In selecting an approach for implementing the metals criteria, the principal issue is the correlation between metals that are measured and metals that are biologically available and toxic. In order to assure that the metals criteria are appropriate for the chemical conditions under which they are applied, EPA is providing for the

adjustment of the criteria through application of the "water-effect ratio" procedure. EPA notes that performing the testing to use a site-specific water-effect ratio is optional on the part of the State.

In the NTR, as amended, EPA identified the water-effect ratio (WER) procedure as a method for optional site-specific criteria development for certain metals. The WER approach compares bioavailability and toxicity of a specific pollutant in receiving waters and in laboratory waters. A WER is an appropriate measure of the toxicity of a material obtained in a site water divided by the same measure of the toxicity of the same material obtained simultaneously in a laboratory dilution water.

On February 22, 1994, EPA issued *Interim Guidance on the Determination and Use of the Water-Effect Ratios for Metals* (EPA 823-B-94-001) now incorporated into the updated Second Edition of the Water Quality Standards Handbook, Appendix L. A copy of the Handbook is contained in the administrative record for today's rule. In accordance with the WER guidance and where application of the WER is deemed appropriate, EPA strongly encourages the application of the WER on a watershed or water body basis as part of a water quality criteria in California as opposed to the application on a discharger-by-discharger basis through individual NPDES permits. This approach is technically sound and an efficient use of resources. However, discharger specific WERs for individual NPDES permit limits are possible and potentially efficient where the NPDES discharger is the only point source discharger to a specific water body.

The rule requires a default WER value of 1.0 which will be assumed, if no site-specific WER is determined. To use a WER other than the default of 1.0, the rule requires that the WER must be determined as set forth in EPA's WER guidance or by another scientifically defensible method that has been adopted by the State as part of its water quality standards program and approved by EPA.

The WER is a more comprehensive mechanism for addressing bioavailability issues than simply expressing the criteria in terms of dissolved metal. Consequently, expressing the criteria in terms of dissolved metal, as done in today's rule for California, does not completely eliminate the utility of the WER. This is particularly true for copper, a metal that forms reduced-toxicity complexes with dissolved organic matter.

The *Interim Guidance on Determination and Use of Water-Effect Ratios for Metals* explains the relationship between WERs for dissolved criteria and WERs for total recoverable criteria. Dissolved measurements are to be used in the site-specific toxicity testing underlying the WERs for dissolved criteria. Because WERs for dissolved criteria generally are little affected by elevated particulate concentrations, EPA expects those WERs to be somewhat less than WERs for total recoverable criteria in such situations. Nevertheless, after the site-specific ratio of dissolved to total metal has been taken into account, EPA expects a permit limit derived using a WER for a dissolved criterion to be similar to the permit limit that would be derived from the WER for the corresponding total recoverable criterion.

d. Saltwater Copper Criteria

The saltwater copper criteria for aquatic life in today's rule are 4.8 µg/l (CMC) and 3.1 µg/l (CCC) in the dissolved form. These criteria reflect new data including data collected from studies for the New York/New Jersey Harbor and the San Francisco Bay indicating a need to revise the former copper 304(a) criteria guidance document to reflect a change in the saltwater CMC and CCC aquatic life values. These data also reflect a comprehensive literature search resulting in added toxicity test data for seven new species to the database for the saltwater copper criteria. EPA believes these new data have national implications and the national criteria guidance now contains a CMC of 4.8 µg/l dissolved and a CCC of 3.1 µg/l dissolved. In the amendments to the NTR, EPA noticed the availability of data to support these changes to the NTR, and solicited comments. The data can be found in the draft document entitled, *Ambient Water Quality Criteria—Copper, Addendum 1995*. This document is available from the Office of Water Resource Center and is available for review in the administrative record for today's rule.

e. Chronic Averaging Period

In establishing water quality criteria, EPA generally recommends an "averaging period" which reflects the duration of exposure required to elicit effects in individual organisms (TSD, Appendix D-2). The criteria continuous concentration, or CCC, is intended to be the highest concentration that could be maintained indefinitely in a water body without causing an unacceptable effect on the aquatic community or its uses (TSD, Appendix D-1). As aquatic organisms do not generally experience steady exposure, but rather fluctuating exposures to pollutants, and because aquatic organisms can generally tolerate higher concentrations of pollutants over a shorter periods of time, EPA expects that the concentration of a pollutant can exceed the CCC without causing an unacceptable effect if (a) the magnitude and duration of exceedences are appropriately limited and (b) there are compensating periods of time during which the concentration is below the CCC. This is done by specifying a duration of an "averaging period" over which the average concentration should not exceed the CCC more often than specified by the frequency (TSD, Appendix D-1).

EPA is promulgating a 4-day averaging period for chronic criteria, which means that measured or predicted ambient pollutant concentrations should be averaged over a 4-day period to determine attainment of chronic criteria. The State may apply to EPA for approval of an alternative averaging period. To do so, the State must submit to EPA the basis for such alternative averaging period.

The most important consideration for setting an appropriate averaging period is the length of time that sensitive organisms can tolerate exposure to a pollutant at levels exceeding a criterion without showing adverse effects on survival, growth, or reproduction. EPA believes that the chronic averaging period must be shorter than the duration of the chronic tests on which the CCC is based, since, in some cases, effects are elicited before exposure of the entire duration. Most of the toxicity tests used to establish the chronic criteria are conducted using steady exposure to toxicants for a least 28 days (TSD, page 35). Some chronic tests, however, are much shorter than this (TSD, Appendix D-2). EPA selected the 4-day averaging period based on the shortest duration in which chronic test effects are sometimes observed for certain species and toxicants. In addition, EPA believes that the results of some chronic tests are due to an acute effect on a sensitive life stage that occurs some time during the test, rather than being caused by long-term stress or long-term accumulation of the test material in the organisms.

Additional discussion of the rationale for the 4-day averaging period is contained in Appendix D of the TSD. Balancing all of the above factors and data, EPA believes that the 4-day averaging period falls within the scientifically reasonable range of values for choice of the averaging period, and is an appropriate length of time of

pollutant exposure to ensure protection of sensitive organisms.

EPA established a 4-day averaging period in the NTR. In settlement of litigation on the NTR, EPA stated that it was "in the midst of conducting, sponsoring, or planning research related to the basis for and application of" water quality criteria and mentioned the issue of averaging period. See Partial Settlement Agreement in *American Forest and Paper Ass'n, Inc. et al.* v. *U.S. EPA* (Consolidated Case No. 93–0694 (RMU), D.D.C.). EPA is re-evaluating issues raised about averaging periods and will, if appropriate, revise the 1985 Guidelines.

EPA received public comment relevant to the averaging period during the comment period for the 1995 Amendments to the NTR (60 FR 22228, May 4, 1995), although these public comments did not address the chronic averaging period separately from the allowable excursion frequency and the design flow. Comments recommended that EPA use the 30Q5 design flow for chronic criteria.

While EPA is undertaking analysis of the chronic design conditions as part of the revisions to the 1985 Guidelines, EPA has not yet completed this work. Until this work is complete, for the reasons set forth in the TSD, EPA continues to believe that the 4-day chronic averaging period represents a reasonable, defensible value for this parameter.

EPA added language to the final rule which will enable the State to adopt alternative averaging periods and frequencies and associated design flows where appropriate. The State may apply to EPA for approval of alternative averaging periods and frequencies and related design flows; the State must submit the bases for any changes. Before approving any change, EPA will publish for public comment, a notice proposing the changes.

f. Hardness

Freshwater aquatic life criteria for certain metals are expressed as a function of hardness because hardness and/or water quality characteristics that are usually correlated with hardness can reduce or increase the toxicities of some metals. Hardness is used as a surrogate for a number of water quality characteristics which affect the toxicity of metals in a variety of ways. Increasing hardness has the effect of decreasing the toxicity of metals. Water quality criteria to protect aquatic life may be calculated at different concentrations of hardnesses measured in milligrams per liter (mg/l) as calcium carbonate ($CaCO_3$).

Section 131.38(b)(2) of the final rule presents the hardness-dependent equations for freshwater metals criteria. For example, using the equation for zinc, the total recoverable CMCs at a hardness of 10, 50, 100 or 200 mg/l as $CaCO_3$ are 17, 67, 120 and 220 micrograms per liter (μg/l), respectively. Thus, the specific value in the table in the regulatory text is for illustrative purposes only. Most of the data used to develop these hardness equations for deriving aquatic life criteria for metals were in the range of 25 mg/l to 400 mg/l as $CaCO_3$, and the formulas are therefore most accurate in this range. The majority of surface waters nationwide and in California have a hardness of less than 400 mg/l as $CaCO_3$.

In the past, EPA generally recommended that 25 mg/l as $CaCO_3$ be used as a default hardness value in deriving freshwater aquatic life criteria for metals when the ambient (or actual) hardness value is below 25 mg/l as $CaCO_3$. However, use of the approach results in criteria that may not be fully protective. Therefore, for waters with a hardness of less than 25 mg/l as $CaCO_3$, criteria should be calculated using the actual ambient hardness of the surface water.

In the past, EPA generally recommended that if the hardness was over 400 mg/l, two options were available: (1) Calculate the criterion using a default WER of 1.0 and using a hardness of 400 mg/l in the hardness equation; or (2) calculate the criterion using a WER and the actual ambient hardness of the surface water in the equation. Use of the second option is expected to result in the level of protection intended in the 1985 Guidelines whereas use of the first option is thought to result in an even more protective aquatic life criterion. At high hardness there is an indication that hardness and related inorganic water quality characteristics do not have as much of an effect on toxicity of metals as they do at lower hardnesses. Related water quality characteristics do not correlate as well at higher hardnesses as they do at lower hardnesses. Therefore, if hardness is over 400 mg/l as $CaCO_3$, a hardness of 400 mg/l as $CaCO_3$ should be used with a default WER of 1.0; alternatively, the WER and actual hardness of the surface water may be used.

EPA requested comments in the NTR amendments on the use of actual ambient hardness for calculating criteria when the hardness is below 25 mg/l as $CaCO_3$, and when hardness is greater than 400 mg/l as $CaCO_3$. Most of the comments received were in favor of using the actual hardness with the use of the water-effect ratio (1.0 unless otherwise specified by the permitting authority) when the hardness is greater than 400 mg/l as $CaCO_3$. A few commenters did not want the water-effect ratio to be mandatory in calculating hardness, and other commenters had concerns about being responsible for deriving an appropriate water-effect ratio. Overall, the commenters were in favor of using the actual hardness when calculating hardness-dependent freshwater metals criteria for hardness between 0–400 mg/l as $CaCO_3$. EPA took those comments into account in promulgating today's rule.

A hardness equation is most accurate when the relationships between hardness and the other important inorganic constituents, notably alkalinity and pH, are nearly identical in all of the dilution waters used in the toxicity tests and in the surface waters to which the equation is to be applied. If an effluent raises hardness but not alkalinity and/or pH, using the hardness of the downstream water might provide a lower level of protection than intended by the 1985 guidelines. If it appears that an effluent causes hardness to be inconsistent with alkalinity and/or pH, the intended level of protection will usually be maintained or exceeded if either (1) data are available to demonstrate that alkalinity and/or pH do not affect the toxicity of the metal, or (2) the hardness used in the hardness equation is the hardness of upstream water that does not contain the effluent. The level of protection intended by the 1985 guidelines can also be provided by using the WER procedure.

In some cases, capping hardness at 400 mg/l might result in a level of protection that is higher than that intended by the 1985 guidelines, but any such increase in the level of protection can be overcome by use of the WER procedure. For metals whose criteria are expressed as hardness equations, use of the WER procedure will generally be intended to account for effects of such water quality characteristics as total organic carbon on the toxicities of metals. The WER procedure is equally useful for accounting for any deviation from a hardness equation in a site water.

3. Human Health Criteria

EPA's CWA section 304(a) human health criteria guidance provides criteria recommendations to minimize adverse human effects due to substances in ambient water. EPA's CWA section 304(a) criteria guidance for human health are based on two types of

toxicological endpoints: (1) carcinogenicity and (2) systemic toxicity (i.e., all other adverse effects other than cancer). Thus, there are two procedures for assessing these health effects: one for carcinogens and one for non-carcinogens.

If there are no data on how a chemical agent causes cancer, EPA's existing human health guidelines assume that carcinogenicity is a "non-threshold phenomenon," that is, there are no "safe" or "no-effect levels" because even extremely small doses are assumed to cause a finite increase in the incidence of the effect (i.e., cancer). Therefore, EPA's water quality criteria guidance for carcinogens are presented as pollutant concentrations corresponding to increases in the risk of developing cancer. See Human Health Guidelines at 45 FR 79347.

With existing criteria, pollutants that do not manifest any apparent carcinogenic effect in animal studies (i.e., systemic toxicants), EPA assumes that the pollutant has a threshold below which no effect will be observed. This assumption is based on the premise that a physiological mechanism exists within living organisms to avoid or overcome the adverse effect of the pollutant below the threshold concentration.

Note: Recent changes in the Agency's cancer guidelines addressing these assumptions are described in the Draft Water Quality Criteria Methodology: Human Health, 63 FR 43756, August 14, 1998.

The human health risks of a substance cannot be determined with any degree of confidence unless dose-response relationships are quantified. Therefore, a dose-response assessment is required before a criterion can be calculated. The dose-response assessment determines the quantitative relationships between the amount of exposure to a substance and the onset of toxic injury or disease. Data for determining dose-response relationships are typically derived from animal studies, or less frequently, from epidemiological studies in exposed populations.

The dose-response information needed for carcinogens is an estimate of the carcinogenic potency of the compound. Carcinogenic potency is defined here as a general term for a chemical's human cancer-causing potential. This term is often used loosely to refer to the more specific carcinogenic or cancer slope factor which is defined as an estimate of carcinogenic potency derived from animal studies or epidemiological data of human exposure. It is based on extrapolation from test exposures of high doses over relatively short periods of time to more realistic low doses over a lifetime exposure period by use of linear extrapolation models. The cancer slope factor, q1*, is EPA's estimate of carcinogenic potency and is intended to be a conservative upper bound estimate (e.g. 95% upper bound confidence limit).

For non-carcinogens, EPA uses the reference dose (RfD) as the dose-response parameter in calculating the criteria. For non-carcinogens, oral RfD assessments (hereinafter simply "RfDs") are developed based on pollutant concentrations that cause threshold effects. The RfD is an estimate (with uncertainty spanning perhaps an order of magnitude) of a daily exposure to the human population (including sensitive subgroups) that is likely to be without appreciable risk of deleterious effects during a lifetime. See Human Health Guidelines. The RfD was formerly referred to as an "Acceptable Daily Intake" or ADI. The RfD is useful as a reference point for gauging the potential effect of other doses. Doses that are less than the RfD are not likely to be associated with any health risks, and are therefore less likely to be of regulatory concern. As the frequency of exposures exceeding the RfD increases and as the size of the excess increases, the probability increases that adverse effect may be observed in a human population. Nonetheless, a clear conclusion cannot be categorically drawn that all doses below the RfD are "acceptable" and that all doses in excess of the RfD are "unacceptable." In extrapolating non-carcinogen animal test data to humans to derive an RfD, EPA divides either a No Observed-Adverse Effect Level (NOAEL), Lowest Observed Adverse Effect Level (LOAEL), or other benchmark dose observed in animal studies by an "uncertainty factor" which is based on professional judgment of toxicologists and typically ranges from 10 to 10,000.

For CWA section 304(a) human health criteria development, EPA typically considers only exposures to a pollutant that occur through the ingestion of water and contaminated fish and shellfish. Thus, the criteria are based on an assessment of risks related to the surface water exposure route only where designated uses are drinking water and fish and shellfish consumption.

The assumed exposure pathways in calculating the criteria are the consumption of 2 liters per day of water at the criteria concentration and the consumption of 6.5 grams per day of fish and shellfish contaminated at a level equal to the criteria concentration but multiplied by a "bioconcentration factor." The use of fish and shellfish consumption as an exposure factor requires the quantification of pollutant residues in the edible portions of the ingested species.

Bioconcentration factors (BCFs) are used to relate pollutant residues in aquatic organisms to the pollutant concentration in ambient waters. BCFs are quantified by various procedures depending on the lipid solubility of the pollutant. For lipid soluble pollutants, the average BCF is calculated from the weighted average percent lipids in the edible portions of fish and shellfish, which is about 3%; or it is calculated from theoretical considerations using the octanol/water partition coefficient. For non-lipid soluble compounds, the BCF is determined empirically. The assumed water consumption is taken from the National Academy of Sciences publication *Drinking Water and Health* (1977). (Referenced in the Human Health Guidelines.) This value is appropriate as it includes a margin of safety so that the general population is protected. See also EPA's discussion of the 2.0 liters/day assumption at 61 FR 65183 (Dec. 11, 1996). The 6.5 grams per day contaminated fish and shellfish consumption value was equivalent to the average per-capita consumption rate of all (contaminated and non-contaminated) freshwater and estuarine fish and shellfish for the U.S. population. See Human Health Guidelines.

EPA assumes in calculating water quality criteria that the exposed individual is an average adult with body weight of 70 kilograms. EPA assumes 6.5 grams per day of contaminated fish and shellfish consumption and 2.0 liters per day of contaminated drinking water consumption for a 70 kilogram person in calculating the criteria. Regarding issues concerning criteria development and differences in dose per kilogram of body weight, RfDs are always derived based on the most sensitive health effect endpoint. Therefore, when that basis is due to a chronic or lifetime health effect, the exposure parameters assume the exposed individual to be the average adult, as indicated above.

In the absence of this final rule, there may be particular risks to children. EPA believes that children are protected by the human health criteria contained in this final rule. Children are protected against other less sensitive adverse health endpoints due to the conservative way that the RfDs are derived. An RfD is a public health protective endpoint. It is an amount of a chemical that can be consumed on a daily basis for a lifetime without expecting an adverse effect. RfDs are based on sensitive health endpoints and

are calculated to be protective for sensitive human sub-populations including children. If the basis of the RfD was due to an acute or shorter-term developmental effect, EPA uses exposure parameters other than those indicated above. Specifically, EPA uses parameters most representative of the population of concern (*e.g.*, the health criteria for nitrates based on infant exposure parameters). For carcinogens, the risk assessments are upper bound one in a million (10^{-6}) lifetime risk numbers. The risk to children is not likely to exceed these upper bounds estimates and may be zero at low doses. The exposure assumptions for drinking water and fish protect children because they are conservative for infants and children. EPA assumes 2 liters of untreated surface water and 6.5 grams of freshwater and estuarine fish are consumed each day. EPA believes the adult fish consumption assumption is conservative for children because children generally consume marine fish not freshwater and estuarine.

EPA has a process to develop a scientific consensus on oral reference dose assessments and carcinogenicity assessments (hereinafter simply cancer slope factors or slope factors or q1*s). Through this process, EPA develops a consensus of Agency opinion which is then used throughout EPA in risk management decision-making. EPA maintains an electronic data base which contains the official Agency consensus for oral RfD assessments and carcinogenicity assessments which is known as the Integrated Risk Information System (IRIS). It is available for use by the public on the National Institutes of Health's National Library of Medicine's TOXNET system, and through diskettes from the National Technical Information Service (NTIS). (NTIS access number is PB 90–591330.)

Section 304(a)(1) of the CWA requires EPA to periodically revise its criteria guidance to reflect the latest scientific knowledge: "(A) On the kind and extent of all identifiable effects on health and welfare * * *; (B) on the concentration and dispersal of pollutants, or their byproducts, through biological, physical, and chemical processes; and (C) on the effects of pollutants on the biological community diversity, productivity, and stability, including information on the factors affecting eutrophication rates of organic and inorganic sedimentation for varying types of receiving waters." In developing up-to-date water quality criteria for the protection of human health, EPA uses the most recent IRIS values (RfDs and q1*s) as the toxicological basis in the criterion calculation. IRIS reflects EPA's most current consensus on the toxicological assessment for a chemical. In developing the criteria in today's rule, the IRIS values as of October 1996 were used together with currently accepted exposure parameters for bioconcentration, fish and shellfish and water consumption, and body weight. The IRIS cover sheet for each pollutant criteria included in today's rule is contained in the administrative record.

For the human health criteria included in today's rule, EPA used the Human Health Guidelines on which criteria recommendations from the appropriate CWA section 304(a) criteria guidance document were based. (These documents are also placed in the administrative record for today's rule.) Where EPA has changed any parameters in IRIS used in criteria derivation since issuance of the criteria guidance document, EPA recalculated the criteria recommendation with the latest IRIS information. Thus, there are differences between the original 1980 criteria guidance document recommendations, and those in this rule, but this rule presents EPA's most current CWA section 304(a) criteria recommendation. The basis (q1* or RfD) and BCF for each pollutant criterion in today's rule is contained in the rule's Administrative Record Matrix which is included in the administrative record for the rule. In addition, all recalculated human health numbers are denoted by an "a" in the criteria matrix in 40 CFR 131.38(b)(1) of the rule. The pollutants for which a revised human health criterion has been calculated since the December 1992 NTR include:

mercury
dichlorobromomethane
1,2-dichloropropane
1,2-trans-dichloroethylene
2,4-dimethylphenol
acenaphthene
benzo(a)anthracene
benzo(a)pyrene
benzo(b)flouranthene
benzo(k)flouranthene
2-chloronaphthalene
chrysene
dibenzo(a,h)anthracene
indeno(1,2,3-cd)pyrene
N-nitrosodi-n-propylamine
alpha-endosulfan
beta-endosulfan
endosulfan sulfate
2-chlorophenol
butylbenzyl phthalate
polychlorinated biphenyls.

In November of 1991, the proposed NTR presented criteria for several pollutants in parentheses. These were pollutants for which, in 1980, insufficient information existed to develop human health water quality criteria, but for which, in 1991, sufficient information existed. Since these criteria did not undergo the public review and comment in a manner similar to the other water quality criteria presented in the NTR (for which sufficient information was available in 1980 to develop a criterion, as presented in the 1980 criteria guidance documents), they were not proposed for adoption into the water quality criteria, but were presented to serve as notice for inclusion in future State triennial reviews. Today's rule promulgates criteria for these nine pollutants:

copper
1, 2-dichloropropane
1,2-trans-dichloroethylene
2,4-dimethylphenol
acenaphthene
2-chloronaphthalene
N-nitrosodi-n-propylamine
2-chlorophenol
butylbenzene phthalate

All the criteria are based on IRIS values—either an RfD or q1*—which were listed on IRIS as of November 1991, the date of the proposed NTR. These values have not changed since the final NTR was published in December of 1992. The rule's Administrative Record Matrix in the administrative record of today's rule contains the specific RfDs, q1*s, and BCFs used in calculating these criteria.

Proposed Changes to the Human Health Criteria Methodology: EPA recently proposed revisions to the 1980 ambient water quality criteria derivation guidelines (the Human Health Guidelines). See *Draft Water Quality Criteria Methodology: Human Health,* 63 FR 43756, August 14, 1998; see also *Draft Water Quality Criteria Methodology: Human Health,* U.S. EPA Office of Water, EPA 822–Z–98–001. The EPA revisions consist of five documents: *Draft Water Quality Criteria Methodology: Human Health,* EPA 822–Z–98–001; *Ambient Water Quality Criteria Derivation Methodology Human Health, Technical Support Document, Final Draft,* EPA–822–B–98–005; and three Ambient Water Quality Criteria for the Protection of Human Health, Drafts—one each for Acrylonitrile, 1,3-Dichloropropene (1,3-DCP), and Hexachlorobutadiene (HCBD), respectively, EPA–822–R–98–006, –005, and –004. All five documents are contained in the administrative record for today's rule.

The proposed methodology revisions reflect significant scientific advances that have occurred during the past nineteen years in such key areas as cancer and noncancer risk assessments, exposure assessments and bioaccumulation. For specific details on

these proposed changes and others, please refer to the **Federal Register** notice or the EPA document.

It should be noted that some of the proposed changes may result in significant numeric changes in the ambient water quality criteria. However, EPA will continue to rely on existing criteria as the basis for regulatory and non-regulatory decisions, until EPA revises and reissues a 304(a) criteria guidance using the revised final human health criteria methodology. The existing criteria are still viewed as scientifically acceptable by EPA. The intention of the proposed methodology revisions is to present the latest scientific advancements in the areas of risk and exposure assessment in order to incrementally improve the already sound toxicological and exposure bases for these criteria. As EPA's current human health criteria are the product of many years worth of development and peer review, it is reasonable to assume that revisiting all existing criteria, and incorporating peer review into such review, could require comparable amounts of time and resources. Given these circumstances, EPA proposed a process for revisiting these criteria as part of the overall revisions to the methodology for deriving human health criteria. This process is discussed in the Implementation Section of the Notice of *Draft Revisions to the Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health* (see 63 FR 43771–43776, August 14, 1998).

The State of California in its Ocean Plan, adopted in 1990 and approved by EPA in 1991, established numeric water quality criteria using an average fish and shellfish consumption rate of 23 grams per day. This value is based on an earlier California Department of Health Services estimate. The State is currently in the process of readopting its water quality control plans for inland surface waters, enclosed bays, and estuaries. The State intends to consider information on fish and shellfish consumption rates evaluated and summarized in a report prepared by the State's Pesticide and Environmental Toxicology Section of the Office of Environmental Health Hazard Assessment of the California Environmental Protection Agency. The report, entitled, *Chemicals in Fish Report No. 1: Consumption of Fish and Shellfish in California and the United States,* was published in final draft form in July of 1997, and released to the public on September 16, 1997. The report is currently undergoing final evaluation, and is expected to published in final form in the near future. This final draft report is contained in the administrative record for today's rule. Although EPA has not used this fish consumption value here because this information has not yet been finalized, the State may use any appropriate higher state-specific fish and shellfish consumption rates in its readoption of criteria in its statewide plans.

a. 2,3,7,8-TCDD (Dioxin) Criteria

In today's action, EPA is promulgating human health water quality criteria for 2,3,7,8-tetrachlorodibenzo-p-dioxin ("dioxin") at the same levels as promulgated in the NTR, as amended. These criteria are derived from EPA's 1984 CWA section 304(a) criteria guidance document for dioxin.

For National Pollutant Discharge Elimination System (NPDES) purposes, EPA supports the regulation of other dioxin and dioxin-like compounds through the use of toxicity equivalencies or TEQs in NPDES permits (see discussion below). For California waters, if the discharge of dioxin or dioxin-like compounds has reasonable potential to cause or contribute to a violation of a narrative criterion, numeric water quality-based effluent limits for dioxin or dioxin-like compounds should be included in NPDES permits and should be expressed using a TEQ scheme.

EPA has been evaluating the health threat posed by dioxin nearly continuously for over two decades. Following issuance of the 1984 criteria guidance document, evaluating the health effects of dioxin and recommending human health criteria for dioxin, EPA prepared draft reassessments reviewing new scientific information relating to dioxin in 1985 and 1988. EPA's Science Advisory Board (SAB), reviewing the 1988 draft reassessment, concluded that while the risk assessment approach used in 1984 criteria guidance document had inadequacies, a better alternative was unavailable (see SAB's *Dioxin Panel Review of Documents from the Office or Research and Development relating to the Risk and Exposure Assessment of 2,3,7,8-TCDD* (EPA–SAB–EC–90–003, November 28, 1989) included in the administrative record for today's rule). Between 1988 and 1990, EPA issued numerous reports and guidances relating to the control of dioxin discharges from pulp and paper mills. See e.g., EPA Memorandum, "Strategy for the Regulation of Discharges of PHDDs & PHDFs from Pulp and Paper Mills to the Waters of the United States," from Assistant Administrator for Water to Regional Water Management Division Directors and NPDES State Directors, dated May 21, 1990 (AR NL–16); EPA Memorandum, "State Policies, Water Quality Standards, and Permit Limitations Related to 2,3,7,8-TCDD in Surface Water," from the Assistant Administrator for Water to Regional Water Management Division Directors, dated January 5, 1990 (AR VA–66). These documents are available in the administrative record for today's rule.

In 1991, EPA's Administrator announced another scientific reassessment of the risks of exposure to dioxin (see Memorandum from Administrator William K. Reilly to Erich W. Bretthauer, Assistant Administrator for Research and Development and E. Donald Elliott, General Counsel, entitled *Dioxin: Follow-Up to Briefing on Scientific Developments,* April 8, 1991, included in the administrative record for today's rule). At that time, the Administrator made clear that while the reassessment was underway, EPA would continue to regulate dioxin in accordance with existing Agency policy. Thereafter, the Agency proceeded to regulate dioxin in a number of environmental programs, including standards under the Safe Drinking Water Act and the CWA.

The Administrator's promulgation of the dioxin human health criteria in the 1992 NTR affirmed the Agency's decision that the ongoing reassessment should not defer or delay regulating this potent contaminant, and further, that the risk assessment in the 1984 criteria guidance document for dioxin continued to be scientifically defensible. Until the reassessment process was completed, the Agency could not "say with any certainty what the degree or directions of any changes in the risk estimates might be" (57 FR 60863–64).

The basis for the dioxin criteria as well as the decision to include the dioxin criteria in the 1992 NTR pending the results of the reassessment were challenged. See *American Forest and Paper Ass'n, Inc. et al.* v. *U.S. EPA* (Consolidated Case No. 93–0694 (RMU) D.D.C.). By order dated September 4, 1996, the Court upheld EPA's decision. EPA's brief and the Court's decision are included in the administrative record for today's rule.

EPA has undertaken significant effort toward completion of the dioxin reassessment. On September 13, 1994, EPA released for public review and comment a draft reassessment of toxicity and exposure to dioxin. See *Health Assessment Document for 2,3,7,8-Tetrachlorobenzo-p-Dioxin (TCDD) and Related Compounds,* U.S. EPA, 1994. EPA is currently addressing comments made by the public and the SAB and anticipates that the final

revised reassessment will go to the SAB in the near future. With today's rule, the Agency reaffirms that, notwithstanding the on-going risk reassessment, EPA intends to continue to regulate dioxin to avoid further harm to public health, and the basis for the dioxin criteria, both in terms of the cancer potency and the exposure estimates, remains scientifically defensible. The fact that EPA is reassessing the risk of dioxin, virtually a continuous process to evaluate new scientific information, does not mean that the current risk assessment is "wrong". It continues to be EPA's position that until the risk assessment for dioxin is revised, EPA supports and will continue to use the existing risk assessment for the regulation of dioxin in the environment. Accordingly, EPA today promulgates dioxin criteria based on the 1984 criteria guidance document for dioxin and promulgated in the NTR in 1992.

Toxicity Equivalency: The State of California, in its 1991 water quality control plans, adopted human health criteria for dioxin and dioxin-like compounds based on the concept of toxicity equivalency (TEQ) using toxicity equivalency factors (TEFs). EPA Region 9 reviewed and approved the State's use of the TEQ concept and TEFs in setting the State's human health water quality criteria for dioxin and dioxin-like compounds.

In 1987, EPA formally embraced the TEQ concept as an interim procedure to estimate the risks associated with exposures to 210 chlorinated dibenzo-p-dioxin and chlorinated dibenzofuran (CDD/CDF) congeners, including 2,3,7,8-TCDD. This procedure uses a set of derived TEFs to convert the concentration of any CDD/CDF congener into an equivalent concentration of 2,3,7,8-TCDD. In 1989, EPA updated its TEFs based on an examination of relevant scientific evidence and a recognition of the value of international consistency. This updated information can be found in EPA's 1989 *Update to the Interim Procedures for Estimating Risks Associated with Exposures to Mixtures of Chlorinated Dibenzo-p-dioxins and -dibenzofurans (CDDs and CDFs)* (EPA/625/3–89/016, March 1989). EPA had been active in an international effort aimed at adopting a common set of TEFs (International TEFs/89 or I–TEFs/89), to facilitate information exchange on environmental contamination of CDD/CDF. This document reflects EPA's support of an internationally consistent set of TEFs, the I–TEFs/89. EPA uses I–TEFs/89 in many of its regulatory programs.

In 1994, the World Health Organization (WHO) revised the TEF scheme for dioxins and furans to include toxicity from dioxin-like compounds (Ahlborg et al., 1994). However, no changes were made to the TEFs for dioxins and furans. In 1998, the WHO re-evaluated and revised the previously established TEFs for dioxins (Ds), furans (Fs) and dioxin-like compounds (Vanden Bers, 1998). The nomenclature for this TEF scheme is TEQDFP–WHO98, where TEQ represents the 2,3,7,8-TCDD Toxic Equivalence of the mixture, and the subscript DFP indicates that dioxins (Ds) furans (Fs) and dioxin-like compounds (P) are included in the TEF scheme. The subscript 98 following WHO displays the year changes were made to the TEF scheme.

EPA intends to use the 1998 WHO TEF scheme in the near future. At this point however, EPA will support the use of either the 1989 interim procedures or the 1998 WHO TEF scheme but encourages the use of the 1998 WHO TEF scheme in State programs. EPA expects California to use a TEF scheme in implementing the 2,3,7,8-TCDD water quality criteria contained in today's rule. The TEQ and TEF approach provide a methodology for setting NPDES water quality-based permit limits that are protective of human health for dioxin and dioxin-like compounds.

Several commenters requested EPA to promulgate criteria for other forms of dioxin, in addition to 2,3,7,8-TCDD. EPA's draft reassessment for dioxin examines toxicity based on the TEQ concept and I–TEFs/89. When EPA completes the dioxin reassessment, the Agency intends to adopt revised 304(a) water quality criteria guidance based on the reassessment for dioxin. If necessary, EPA will then act to amend the NTR and CTR to reflect the revised 304(a) water quality criteria guidance.

b. Arsenic Criteria

EPA is not promulgating human health criteria for arsenic in today's rule. EPA recognizes that it promulgated human health water quality criteria for arsenic for a number of States in 1992, in the NTR, based on EPA's 1980 section 304(a) criteria guidance for arsenic established, in part, from IRIS values current at that time. However, a number of issues and uncertainties existed at the time of the CTR proposal concerning the health effects of arsenic. These issues and uncertainties were summarized in "Issues Related to Health Risk of Arsenic" which is contained in the administrative record for today's rule. During the period of this rulemaking action, EPA commissioned a study of arsenic health effects by the National Research Council (NRC) arm of the National Academy of Sciences. EPA received the NRC report in March of 1999. EPA scientists reviewed the report, which recommended that EPA lower the Safe Drinking Water Act arsenic maximum contaminant level (MCL) as soon as possible (The arsenic MCL is currently 50 μg/l.) The bladder cancer analysis in the NRC report will provide part of the basis for the risk assessment of a proposed revised arsenic MCL in the near future. After promulgating a revised MCL for drinking water, the Agency plans to revise the CWA 304(a) human health criteria for arsenic in order to harmonize the two standards. Today's rule defers promulgating arsenic criteria based on the Agency's previous risk assessment of skin cancer. In the meantime, permitting authorities in California should rely on existing narrative water quality criteria to establish effluent limitations as necessary for arsenic. California has previously expressed its science and policy position by establishing a criterion level of 5 μg/l for arsenic. Permitting authorities may, among other considerations, consider that value when evaluating and interpreting narrative water quality criteria.

c. Mercury Criteria

The human health criteria promulgated here use the latest RfD in EPA's Integrated Risk Information System (IRIS) and the weighted average practical bioconcentration factor (PBCF) from the 1980 section 304(a) criteria guidance document for mercury. EPA considered the approach used in the Great Lakes Water Quality Guidance ("Guidance") incorporating Bioaccumulation Factors (BAFs), but rejected this approach for reasons outlined below. The equation used here to derive an ambient water quality criterion for mercury from exposure to organisms and water is:

$$HHC = \frac{RfD \times BW}{WC + (FC \times PBCF)}$$

Where:

RfD = Reference Dose
BW = Body Weight
WC = Water Consumption
FC = Total Fish and Shellfish Consumption per Day
PBCF = Practical Bioconcentration Factor (weighted average)

For mercury, the most current RfD from IRIS is 1×10^{-4} mg/kg/day. The RfD used a benchmark dose as an estimate of a No Observed Adverse Effect Level (NOAEL). The benchmark dose was calculated by applying a Weibel model

for extra risk to all neurological effects observed in 81 Iraqi children exposed in utero as reported in Marsh, et. al. (1987). Maternal hair mercury was the measure of exposure. Extra risk refers to an adjustment for background incidence of a given health effect. Specifically, the extra risk is the added incidence of observing an effect above the background rate relative to the proportion of the population of interest that is not expected to exhibit such as effect. The resulting estimate was the lower 95% statistical bound on the 10% extra risk; this was 11 ppm mercury in maternal hair. This dose in hair was converted to an equivalent ingested amount by applying a model based on data from human studies; the resulting benchmark dose was 1×10^{-3} mg/kg body weight /day. The RfD was calculated by dividing the benchmark dose by a composite uncertainty factor of 10. The uncertainty factor was used to account for variability in the human population, in particular the wide variation in biological half-life of methylmercury and the variation that is observed in the ration of hair mercury to mercury in the blood. In addition the uncertainty factor accounts for lack of a two-generation reproductive study and the lack of data on long term effects of childhood mercury exposures. The RfD thus calculated is 1×10^{-4} mg/kg body weight/day or 0.1 µg/kg/day. The body weight used in the equation for the mercury criteria, as discussed in the Human Health Guidelines, is a mean adult human body weight of 70 kg. The drinking water consumption rate, as discussed in the Human Health Guidelines, is 2.0 liters per day.

The bioconcentration factor or BCF is defined as the ratio of chemical concentration in the organism to that in surrounding water. Bioconcentration occurs through uptake and retention of a substance from water only, through gill membranes or other external body surfaces. In the context of setting exposure criteria it is generally understood that the terms "BCF" and "steady-state BCF" are synonymous. A steady-state condition occurs when the organism is exposed for a sufficient length of time that the ratio does not change substantially.

The BCFs that were used herein are the "Practical Bioconcentration Factors (PBCFs)" that were derived in 1980: 5500 for fresh water, 3765 for estuarine coastal waters, and 9000 for open oceans. See pages C–100–1 of Ambient Water Quality Criteria for Mercury (EPA 440/5–80–058) for a complete discussion on the PBCF. Because of the way they were derived, these PBCFs take into account uptake from food as well as uptake from water. A weighted average PBCF was calculated to take into account the average consumption from the three waters using the following equation:

$$\text{Weighted Average Practical BCF} = \frac{\sum(\text{FC} \times \text{PBCF})}{\sum(\text{FC})} = \frac{(0.00172)(5500) + (0.00478)(3765) + (0.0122)(9000)}{0.00172 + 0.00478 + 0.0122} = \frac{137.3}{0.0187} = 7342.6$$

Given the large value for the weighted average PBCF, the contribution of drinking water to total daily intake is negligible so that assumptions concerning the chemical form of mercury in drinking water become less important. The human health mercury criteria promulgated for this rule are based on the latest RfD as listed in IRIS and a weighted PBCF from the 1980 § 304(a) criteria guidance document for mercury.

On March 23, 1995 (60 FR 15366), EPA promulgated the Great Lakes Water Quality Guidance ("Guidance"). The Guidance incorporated bioaccumulation factors (BAFs) in the derivation of criteria to protect human health because it is believed that BAFs are a better predictor than BCFs of the concentration of a chemical within fish tissue since BAFs include consideration of the uptake of contaminants from all routes of exposure. A bioaccumulation factor is defined as the ratio (in L/kg) of a substance's concentration in tissue to the concentration in the ambient water, in situations where both the organism and its food are exposed and the ratio does not change substantially over time. The final Great Lakes Guidance establishes a hierarchy of four methods for deriving BAFs for non-polar organic chemicals: (1) Field-measured BAFs; (2) predicted BAFs derived using a field-measured biota-sediment accumulation factor; (3) predicted BAFs derived by multiplying a laboratory-measured BCF by a food chain multiplier; and (4) predicted BAFs derived by multiplying a BCF calculated from the log Kow by a food-chain multiplier. The final Great Lakes Guidance developed BAFs for trophic levels three and four fish of the Great Lakes Basin. Respectively, the BAFs for mercury for trophic level 3 and 4 fish were: 27,900 and 140,000.

The BAF promulgated in the GLI was developed specifically for the Great Lakes System. It is uncertain whether the BAFs of 27,900 and 140,000 are appropriate for use in California at this time; therefore, today's final rule does not use the GLI BAF in establishing human health criteria for mercury in California. The magnitude of the BAF for mercury in a given system depends on how much of the total mercury is present in the methylated form. Methylation rates vary widely from one water body to another for reasons that are not fully understood. Lacking the data, it is difficult to determine if the BAF used in the GLI represents the true potential for mercury to bioaccumulate in California surface waters. The true, average BAF for California could be higher or lower. For more information see EPA's Response to Comments document in the administrative record for this rule (specifically comments CTR–002–007(b) and CTR–016–007).

EPA is developing a national BAF for mercury as part of revisions to its 304(a) criteria for human health; however, the BAF methodology that will be used is currently under evaluation as part of EPA's revisions to its National Human Health Methodology (see section F.3 above). EPA applied a similar methodology in its Mercury Study Report to Congress (MSRC) to derive a BAF for methylmercury. The MSRC is available through NTIS (EPA–452/R–97–003). Although a BAF was derived in the MSRC, EPA does not intend to use this BAF for National application. EPA is engaged in a separate effort to incorporate additional mercury bioaccumulation data that was not considered in the MSRC, and to assess uncertainties with using a National BAF approach for mercury. Once the proposed revised human health methodology, including the BAF component, is finalized, EPA will revise its 304(a) criteria for mercury to reflect changes in the underlying methodology, recommendations contained in the MSRC, and recommendations in a National Academy of Science report on human health assessment of methylmercury. When EPA changes its 304(a) criteria recommendation for mercury, States and Tribes will be expected to review their water quality standards for mercury and make any revisions necessary to ensure their standards are scientifically defensible.

New information may become available regarding the bioaccumulation

of mercury in certain water bodies in California. EPA supports the use of this information to develop site-specific criteria for mercury. Further, if a California water body is impaired due to mercury fish tissue or sediment contamination, loadings of mercury could contribute to or exacerbate the impairment. Therefore, one option regulatory authorities should consider is to include water quality-based effluent limits (WQBELs) in permits based on mass for discharges to the impaired water body. Such WQBELs must be derived from and comply with applicable State water quality standards (including both numeric and narrative criteria) and assure that the discharge does not cause or contribute to a violation of water quality standards.

d. Polychlorinated Biphenyls (PCBs) Criteria

The NTR, as amended, calculated human health criteria for PCBs using a cancer potency factor of 7.7 per mg/kg-day from the Agency's IRIS. This cancer potency factor was derived from the Norback and Weltman (1985) study which looked at rats that were fed Aroclor 1260. The study used the linearized multistage model with a default cross-species scaling factor (body weight ratio to the ⅔ power). Although it is known that PCB mixtures vary greatly as to their potency in producing biological effects, for purposes of its carcinogenicity assessment, EPA considered Aroclor 1260 to be representative of all PCB mixtures. The Agency did not pool data from all available congener studies or generate a geometric mean from these studies, since the Norback and Weltman study was judged by EPA as acceptable, and not of marginal quality, in design or conduct as compared with other studies. Thereafter, the Institute for Evaluating Health Risks (IEHR, 1991) reviewed the pathological slides from the Norback and Weltman study, and concluded that some of the malignant liver tumors should have been interpreted as nonmalignant lesions, and that the cancer potency factor should be 5.1 per mg/kg-day as compared with EPA's 7.7 per mg/kg-day.

The Agency's peer-reviewed reassessment of the cancer potency of PCBs published in a final report, *PCBs: Cancer Dose-Response Assessment and Applications to Environmental Mixtures* (EPA/600/P–96/001F), adopts a different approach that distinguishes among PCB mixtures by using information on environmental processes. (The report is included in the administrative record of today's rule.) The report considers all cancer studies (which used commercial mixtures only) to develop a range of cancer potency factors, then uses information on environmental processes to provide guidance on choosing an appropriate potency factor for representative classes of environmental mixtures and different pathways. The reassessment provides that, depending on the specific application, either central estimates or upper bounds can be appropriate. Central estimates describe a typical individual's risk, while upper bounds provide assurance (*i.e.*, 95% confidence) that this risk is not likely to be underestimated if the underlying model is correct. Central estimates are used for comparing or ranking environmental hazards, while upper bounds provide information about the precision of the comparison or ranking. In the reassessment, the use of the upper bound values were found to increase cancer potency estimates by two or three-fold over those using central tendency. Upper bounds are useful for estimating risks or setting exposure-related standards to protect public health, and are used by EPA in quantitative cancer risk assessment. Thus, the cancer potency of PCB mixtures is determined using a tiered approach based on environmental exposure routes with upper-bound potency factors (using a body weight ratio to the ¾ power) ranging from 0.07 (lowest risk and persistence) to 2 (high risk and persistence) per mg/kg-day for average lifetime exposures to PCBs. It is noteworthy that bioaccumulated PCBs appear to be more toxic than commercial PCBs and appear to be more persistent in the body. For exposure through the food chain, risks can be higher than other exposures.

EPA issued the final reassessment report on September 27, 1996, and updated IRIS to include the reassessment on October 1, 1996. EPA updated the human health criteria for PCBs in the National Toxics Rule on September 27, 1999. For today's rule, EPA derived the human health criteria for PCBs using a cancer potency factor of 2 per mg/kg-day, an upper bound potency factor reflecting high risk and persistence. This decision is based on recent multimedia studies indicating that the major pathway of exposure to persistent toxic substances such as PCBs is via dietary exposure (*i.e.*, contaminated fish and shellfish consumption).

Following is the calculation of the human health criterion (HHC) for organism and water consumption:

$$HHC = \frac{RF \times BW \times (1{,}000\ \mu g/mg)}{q1^* \times [WC + (FC \times BCF)]}$$

Where:

RF = Risk Factor = 1×10^{-6}
BW = Body Weight = 70 kg
q1* = Cancer slope factor = 2 per mg/kg-day
WC = Water Consumption = 2 l/day
FC = Fish and Shellfish Consumption = 0.0065 kg/day
BCF = Bioconcentration Factor = 31,200

the HHC (μg/l) = 0.00017 μg/l (rounded to two significant digits).

Following is the calculation of the human health criterion for organism only consumption:

$$HHC = \frac{RF \times BW \times (1{,}000\ \mu g/mg)}{q1^* \times FC \times BCF}$$

Where:

RF = Risk Factor = 1×10^{-6}
BW = Body Weight = 70 kg
q1* = Cancer slope factor = 2 per mg/kg-day
FC = Total Fish and Shellfish Consumption per Day = 0.0065 kg/day
BCF = Bioconcentration Factor = 31,200

the HHC (μg/l) = 0.00017 μg/l (rounded to two significant digits).

The criteria are both equal to 0.00017 μg/l and apply to total PCBs. *See PCBs: Cancer Dose Response Assessment and Application to Environmental Mixtures* (EPA/600/9–96–001F). For a discussion of the body weight, water consumption, and fish and shellfish consumption factors, see the Human Health Guidelines. For a discussion of the BCF, see the 304(a) criteria guidance document for PCBs (included in the administrative record for today's rule).

e. Excluded Section 304(a) Human Health Criteria

As is the case in the NTR, as amended, today's rule does not promulgate criteria for certain priority pollutants for which CWA section 304(a) criteria guidance exists because those criteria were not based on toxicity to humans or aquatic organisms. The basis for those particular criteria is organoleptic effects (*e.g.*, taste and odor) which would make water and edible aquatic life unpalatable but not toxic. Because the basis for this rule is to protect the public health and aquatic life from toxicity consistent with the language and intent in CWA section 303(c)(2)(B), EPA is promulgating criteria only for those priority toxic pollutants whose criteria recommendations are based on toxicity. The CWA section 304(a) human health criteria based on organoleptic effects for zinc and 3-methyl-4-chlorophenol are excluded for this reason. See the 1992 NTR discussion at 57 FR 60864.

f. Cancer Risk Level

EPA's CWA section 304(a) criteria guidance documents for priority toxic pollutants that are based on carcinogenicity present concentrations for upper bound risk levels of 1 excess cancer case per 100,000 people (10^{-5}), per 1,000,000 people (10^{-6}), and per 10,000,000 people (10^{-7}). However, the criteria documents do not recommend a particular risk level as EPA policy.

As part of the proposed rule, EPA requested and received comment on the adoption of a 10^{-5} risk level for carcinogenic pollutants. The effect of a 10^{-5} risk level would have been to increase (*i.e.,* make less stringent) carcinogenic pollutant criteria values (noted in the matrix by footnote c) that are not already promulgated in the NTR, by one order of magnitude. For example, the organism-only criterion for gamma BHC (pollutant number 105 in the matrix) is 0.013 µg/l; the criterion based on a 10^{-5} risk level would have been 0.13 µg/l. EPA received several comments that indicated a preference for a higher (10^{-4} and 10^{-5}) risk level for effluent dependent waters or other types of special circumstances.

In today's rule, EPA is promulgating criteria that protect the general population at an incremental cancer risk level of one in a million (10^{-6}) for all priority toxic pollutants regulated as carcinogens, consistent with the criteria promulgated in the NTR for the State of California. Standards adopted by the State contained in the Enclosed Bays and Estuaries Plan (EBEP), and the Inland Surface Waters Plan (ISWP), partially approved by EPA on November 6, 1991, and the Ocean Plan approved by EPA on June 28, 1990, contained a risk level of 10^{-6} for most carcinogens. The State has historically protected at a 10^{-6} risk level for carcinogenic pollutants.

EPA, in its recent human health methodology revisions, proposed acceptable lifetime cancer risk for the general population in the range of 10^{-5} to 10^{-6}. EPA also proposed that States and Tribes ensure the most highly exposed populations do not exceed a 10^{-4} risk level. However, EPA's draft methodology revisions also stated that it will derive 304(a) criteria at a 10^{-6} risk level, which the Agency believes reflects the appropriate risk for the general population and which applies a risk management policy which ensures protection for all exposed population groups. (Draft Water Quality Criteria Methodology: Human Health, EPA 822–Z–98–001, August 1998, Appendix II, page 72).

Subpopulations within a State may exist, such as recreational and subsistence anglers, who as a result of greater exposure to a contaminant are at greater risk than the standard 70 kilogram person eating 6.5 grams per day of fish and shellfish and drinking 2.0 liters per day of drinking water with pollutant levels meeting the water quality criteria. EPA acknowledges that at any given risk level for the general population, those segments of the population that are more highly exposed face a higher relative risk. For example, if fish are contaminated at a level permitted by criteria derived on the basis of a risk level of 10^{-6}, individuals consuming up to 10 times the assumed fish consumption rate would still be protected at a 10^{-5} risk level. Similarly, individuals consuming 100 times the general population rate would be protected at a 10^{-4} risk level. EPA, therefore, believes that derivation of criteria at the 10^{-6} risk level is a reasonable risk management decision protective of designated uses under the CWA. While outside the scope of this rule, EPA notes that States and Tribes, however, have the discretion to adopt water quality criteria that result in a higher risk level (*e.g.,* 10^{-5}). EPA expects to approve such criteria if the State or Tribe has identified the most highly exposed subpopulation within the State or Tribe, demonstrates the chosen risk level is adequately protective of the most highly exposed subpopulation, and has completed all necessary public participation.

This demonstration has not happened in California. Further, the information that is available on highly exposed subpopulations in California supports the need to protect the general population at the 10^{-6} level. California has cited the Santa Monica Bay Seafood Consumption Study as providing the best available data set for estimating consumption of sport fish and shellfish in California for both marine or freshwater sources (Chemicals in Fish Report No. 1: Consumption of Fish and Shellfish in California and the United States, Final Draft Report, July 1997). Consumption rates of sport fish and shellfish of 21g/day, 50 g/day, 107 g/day, and 161 g/day for the median, mean, 90th, and 95th percentile rates, respectively, were determined from this study. Additional consumption of commercial species in the range of approximately 8 to 42 g/day would further increase these values. Clearly the consumption rates for the most highly exposed subpopulation within the State exceeds 10 times the 6.5 g/day rates used in the CTR. Therefore, use of a risk level of 10^{-5} for the general population would not be sufficient to protect the most highly exposed population in California at a 10^{-4} risk level. On the other hand, even the most highly exposed subpopulations cited in the California study do not have consumption rates approaching 100 times the 6.5 g/day rates used in the CTR. The use of the 10^{-6} risk level to protect average level consumers does not subject these subpopulations to risk levels as high as 10^{-4}.

EPA believes its decision to establish a 10^{-6} risk level for the CTR is also consistent with EPA's policy in the NTR to select the risk level that reflect the policies or preferences of CWA programs in the affected States. California adopted standards for priority toxic pollutants for its ocean waters in 1990 using a 10^{-6} risk level to protect human health (California Ocean Plan, 1990). In April 1991, and again in November 1992, California adopted standards for its inland surface waters and enclosed bays and estuaries in its Inland Surface Waters Plan (ISWP) and its Enclosed Bays and Estuaries Plan (EBEP) using a 10^{-6} risk level. To be consistent with the State's water quality standards, EPA used a 10^{-6} risk level for California in the NTR at 57 FR 60867. The State has continued using a 10^{-6} risk level to protect human health for its standards that were not withdrawn with the ISWP and EBEP. The most recent expression of risk level preference is contained in the Draft Functional Equivalent Document, Amendment of the Water Quality Control Plan for Ocean Waters of California, October 1998, where the State recommended maintaining a consistent risk level of 10^{-6} for the human health standards that it was proposing to revise.

EPA received several comments requesting a 10^{-5} risk level based on the risk level chosen for the Great Lakes Water Quality Guidance (the Guidance). There are several differences between the guidelines for the derivation of human health criteria contained in the Guidance and the California Toxics Rule (CTR) that make a 10^{-5} risk factor appropriate for the Guidance, but not for the CTR. These differences result in criteria developed using the 10^{-5} risk factor in the Guidance being at least as stringent as criteria derived under the CTR using a 10^{-6} risk factor. The relevant aspects of the Guidance include:

- Use of fish consumption rates that are considerably higher than fish consumption rates for the CTR.
- Use of bioaccumulation factors rather than bioconcentration factors in

estimating exposure, considerably increasing the dose of carcinogens to sensitive subgroups.

• Consideration of additivity of effects of mixtures for both carcinogenic and noncarcinogenic pollutants.

This combination of factors increase the calculated carcinogenic risk substantially under the Guidance (the combination would generally be more than one order of magnitude), making a lower overall risk factor acceptable. The Guidance risk factor provides, in fact, criteria with at least the same level of protection against carcinogens as criteria derived with a higher risk factor using the CTR. A lower risk factor for the CTR would not be appropriate absent concomitant changes in the derivation procedures that provide equivalent risk protection.

G. Description of Final Rule

1. Scope

Paragraph (a) in 40 CFR 131.38, entitled "Scope," states that this rule is a promulgation of criteria for priority toxic pollutants in the State of California for inland surface waters, enclosed bays, and estuaries. Paragraph (a) in 40 CFR 131.38 also states that this rule contains an authorizing compliance schedule provision.

2. EPA Criteria for Priority Toxic Pollutants

EPA's criteria for California are presented in tabular form at 40 CFR 131.38. For ease of presentation, the table that appears combines water quality criteria promulgated in the NTR, as amended, that are outside the scope of this rulemaking, with the criteria that are within the scope of today's rule. This is intended to help readers determine applicable water quality criteria for the State of California. The table contains footnotes for clarification.

Paragraph (b) in 40 CFR 131.38 presents a matrix of the applicable EPA aquatic life and/or human health criteria for priority toxic pollutants in California. Section 303(c)(2)(B) of the CWA addresses only pollutants listed as "toxic" pursuant to section 307(a) of the CWA for which EPA has developed section 304(a) criteria guidance. As discussed earlier in this preamble, the section 307(a) list of toxics contains 65 compounds and families of compounds, which potentially include thousands of specific compounds. Of these, the Agency identified a list of 126 "priority toxic pollutants" to implement the CWA (see 40 CFR 131.36(b)). Reference in this rule to priority toxic pollutants, toxic pollutants, or toxics refers to the 126 priority toxic pollutants.

EPA has not developed both aquatic life and human health CWA section 304(a) criterion guidance for all of the priority toxic pollutants. The matrix in 40 CFR 131.38(b) contains human health criteria in Column D for 92 priority toxic pollutants which are divided into Column 1: criteria for water consumption (i.e., 2.0 liters per day) and aquatic organism consumption (i.e., 6.5 grams per day of aquatic organisms); and Column 2: criteria for aquatic organism consumption only. The term aquatic organism includes fish and shellfish such as shrimp, clams, oysters and mussels. One reason the total number of priority toxic pollutants with criteria today differs from the total number of priority toxic pollutants contained in earlier published CWA section 304(a) criteria guidance is because EPA has developed and is promulgating chromium criteria for two valence states with respect to aquatic life criteria. Thus, although chromium is a single priority toxic pollutant, there are two criteria for chromium for aquatic life protection. See pollutant 5 in today's rule at 40 CFR 131.38(b). Another reason is that EPA is promulgating human health criteria for nine priority pollutants for which health-based national criteria have been calculated based on information obtained from EPA's IRIS database (EPA provided notice of these nine criteria in the NTR for inclusion in future State triennial reviews. See 57 FR 60848, 60890).

The matrix contains aquatic life criteria for 23 priority pollutants. These are divided into freshwater criteria (Column B) and saltwater criteria (Column C). These columns are further divided into acute and chronic criteria. The aquatic life criteria are considered by EPA to be protective when applied under the conditions described in the section 304(a) criteria documents and in the TSD. For example, water body uses should be protected if the criteria are not exceeded, on average, once every three year period. It should be noted that the criteria maximum concentrations (the acute criteria) are short-term concentrations and that the criteria continuous concentrations (the chronic criteria) are four-day averages. It should also be noted that for certain metals, the actual criteria are equations which are included as footnotes to the matrix. The toxicity of these metals is water hardness dependent and may be adjusted. The values shown in the table are illustrative only, based on a hardness expressed as calcium carbonate of 100 mg/l. Finally, the criterion for pentachlorophenol is pH dependent. The equation is the actual criterion and is included as a footnote. The value shown in the matrix is for a pH of 7.8. Several of the freshwater aquatic life criteria are incorporated into the matrix in the format used in the 1980 criteria methodology which uses a final acute value instead of a continuous maximum concentration. This distinction is noted in footnote g of the table.

The final rule at 40 CFR 131.38(c) establishes the applicability of the criteria to the State of California. 40 CFR 131.38(d) is described later in Section F, of this preamble. EPA has included in this rule provisions necessary to implement numeric criteria in a way that maintains the level of protection intended. These provisions are included in 40 CFR 131.38(c) of today's rule. For example, in order to do steady state waste load allocation analyses, most States have low flow values for streams and rivers which establish flow rates for various purposes. These low flow values become design flows for sizing treatment plants and developing water quality-based effluent limits and/or TMDLs. Historically, these design flows were selected for the purposes of waste load allocation analyses which focused on instream dissolved oxygen concentrations and protection of aquatic life. With the publication of the 1985 TSD, EPA introduced hydrologically and biologically based analyses for the protection of aquatic life and human health. (These concepts have been expanded subsequently in EPA's *Technical Guidance Manual for Performing Wasteload Allocations, Book 6, Design Conditions*, U.S. EPA, 1986. These analyses are included in Appendix D of the revised TSD. The discussion here is greatly simplified and is provided to support EPA's decision to promulgate design flows for instream flows and thereby maintain the adequacy of the criteria for priority toxic pollutants.) EPA recommended either of two methods for calculating acceptable low flows, the traditional hydrologic method developed by the U.S. Geological Survey or a biological based method developed by EPA. Other methods for evaluating the instream flow record may be available; use of these methods may result in TMDLs and/or water quality-based effluent limitations which adequately protect human health and/or aquatic life. The results of either of these two methods, or an equally protective alternative method, may be used.

The State of California may adopt specific design flows for streams and rivers to protect designated uses against the effects of toxics. EPA believes it is

important to specify design flows in today's rule so that, in the absence of state design flows, the criteria promulgated today would be implemented appropriately. The TSD also recommends the use of three dynamic models to perform wasteload allocations. Dynamic wasteload models do not generally use specific steady state design flows but accomplish the same effect by factoring in the probability of occurrence of stream flows based on the historical flow record.

The low flows specified in the rule explicitly contain duration and frequency of occurrence which represent certain probabilities of occurrence. Likewise, the criteria for priority toxic pollutants are defined with duration and frequency components. Dynamic modeling techniques explicitly predict the effects of variability in receiving water, effluent flow, and pollution variation. Dynamic modeling techniques, as described in the TSD, allow for calculating wasteload allocations that meet the criteria for priority toxic pollutants without using a single, worst-case concentration based on a critical condition. Either dynamic modeling or steady state modeling can be used to implement the criteria promulgated today. For simplicity, only steady state conditions are discussed here. Clearly, if the criteria were implemented using design flows that are too high, the resulting toxic controls would not be adequate, because the resulting ambient concentrations would exceed EPA's criteria.

In the case of aquatic life, assuming exceedences occur more frequently than once in three years on the average, exceedences would result in diminished vitality of stream ecosystems characterized by the loss of desired species. Numeric water quality criteria should apply at all flows that are equal to or greater than flows specified below. The low flow values are:

Type of criteria	Design flow
Acute Aquatic Life (CMC).	1 Q 10 or 1 B 3
Chronic Aquatic Life (CCC).	7 Q 10 or 4 B 3
Human Health	harmonic mean flow

Where:

1 Q 10 is the lowest one day flow with an average recurrence frequency of once in 10 years determined hydrologically;

1 B 3 is biologically based and indicates an allowable exceedence of once every 3 years. It is determined by EPA's computerized method (DFLOW model);

7 Q 10 is the lowest average 7 consecutive day low flow with an average recurrence frequency of once in 10 years determined hydrologically;

4 B 3 is biologically based and indicates an allowable exceedences for 4 consecutive days once every 3 years. It is determined by EPA's computerized method (DFLOW model);

EPA is requiring that the harmonic mean flow be applied with human health criteria. The harmonic mean is a standard calculated statistical value. EPA's model for human health effects assumes that such effects occur because of a long-term exposure to low concentration of a toxic pollutant, for example, two liters of water per day for seventy years. To estimate the concentrations of the toxic pollutant in those two liters per day by withdrawal from streams with a high daily variation in flow, EPA believes the harmonic mean flow is the correct statistic to use in computing such design flows rather than other averaging techniques. (For a description of harmonic means see "Design Stream Flows Based on Harmonic Means," Lewis A. Rossman, Jr. of Hydraulics Engineering, Vol. 116, No. 7, July, 1990.)

All waters (including lakes, estuaries, and marine waters), whether or not suitable for such hydrologic calculations, are subject to the criteria promulgated today. Such criteria will need to be attained at the end of the discharge pipe, unless the State authorizes a mixing zone. Where the State plans to authorize a mixing zone, the criteria would apply at the locations allowed by the mixing zone. For example, the chronic criteria (CCC) would apply at the defined boundary of the chronic mixing zone. Discussion of and guidance on these factors are included in the revised TSD in Chapter 4.

EPA is aware that the criteria promulgated today for some of the priority toxic pollutants are at concentrations less than EPA's current analytical detection limits. Analytical detection limits have never been an acceptable basis for setting water quality criteria since they are not related to actual environmental impacts. The environmental impact of a pollutant is based on a scientific determination, not a measuring technique which is subject to change. Setting the criteria at levels that reflect adequate protection tends to be a forcing mechanism to improve analytical detection methods. See 1985 Guidelines, page 21. As the methods improve, limits based on the actual criteria necessary to protect aquatic life and human health become measurable. The Agency does not believe it is appropriate to promulgate criteria that are not sufficiently protective. EPA discusses this issue further in its Response to Comment Document for today's final rule.

EPA does believe, however, that the use of analytical detection limits are appropriate for assessing *compliance* with National Pollutant Discharge Elimination System (NPDES) permit limits. This view of the role of detection limits was first articulated in guidance for translating dioxin criteria into NPDES permit limits. See "Strategy for the Regulation of Discharges of PHDDs and PHDFs from Pulp and Paper Mills to Waters of the U.S." Memorandum from the Assistant Administrator for Water to the Regional Water Management Division Directors, May 21, 1990. This guidance presented a model for addressing toxic pollutants which have criteria less than current detection limits. EPA, in more recent guidance, recommends the use of the "minimum level" or ML for reporting sample results to assess compliance with WQBELs (TSD page 111). The ML, also called the "quantification level," is the level at which the entire analytical system gives recognizable mass spectra and acceptable calibration points, i.e., the point at which the method can reliably quantify the amount of pollutant in the sample. States can use their own procedures to average and otherwise account for monitoring data, *e.g.*, quantifying results below the ML. These results can then be used to assess compliance with WQBELs. (See 40 CFR part 132, Appendix F, Procedure 8.B.) This approach is applicable to priority toxic pollutants with criteria less than current detection limits. EPA's guidance explains that standard analytical methods may be used for purposes of assessing compliance with permit limits, but not for purposes of establishing water quality criteria or permit limits. Under the CWA, analytical methods are appropriately used in connection with NPDES permit limit compliance assessments. Because of the function of water quality criteria, EPA has not considered the sensitivity of analytical methods in deriving the criteria promulgated today.

EPA has promulgated 40 CFR 131.38(c)(3) to determine when freshwater or saltwater aquatic life criteria apply. This provision incorporates a time parameter to better define the critical condition. The structure of the paragraph is to establish

applicable rules and to allow for site-specific exceptions where the rules are not consistent with actual field conditions. Because a distinct separation generally does not exist between freshwater and saltwater aquatic communities, EPA is establishing the following: (1) The freshwater criteria apply at salinities of 1 part per thousand and below at locations where this occurs 95% or more of the time; (2) saltwater criteria apply at salinities of 10 parts per thousand and above at locations where this occurs 95% more of the time; and (3) at salinities between 1 and 10 parts per thousand the more stringent of the two apply unless EPA approves the application of the freshwater or saltwater criteria based on an appropriate biological assessment. The percentiles included here were selected to minimize the chance of overlap, that is, one site meeting both criteria. Determination of these percentiles can be done by any reasonable means such as interpolation between points with measured data or by the application of calibrated and verified mathematical models (or hydraulic models). It is not EPA's intent to require actual data collection at particular locations.

In the brackish water transition zones of estuaries with varying salinities, there generally will be a mix of freshwater and saltwater species. Generally, therefore, it is reasonable for the more stringent of the freshwater or saltwater criteria to apply. In evaluating appropriate data supporting the alternative set of criteria, EPA will focus on the species composition as its preferred method. This assignment of criteria for fresh, brackish and salt waters was developed in consultation with EPA's research laboratories at Duluth, Minnesota and Narragansett, Rhode Island. The Agency believes such an approach is consistent with field experience.

Paragraph (d) in 40 CFR 131.38 lists the designated water and use classifications for which the criteria apply. The criteria are applied to the beneficial use designations adopted by the State of California; EPA has not promulgated any new use classifications in this rule.

Exceedences Frequency: In a water quality criterion for aquatic life, EPA recommends an allowable frequency for excursions of the criteria. See 1985 Guidelines, pages 11–13. This allowable frequency provides an appropriate period of time during which the aquatic community can recover from the effect of an excursion and then function normally for a period of time before the next excursion. An excursion is defined as an occurrence of when the average concentration over the duration of the averaging period is above the CCC or the CMC. As ecological communities are naturally subjected to a series of stresses, the allowable frequency of pollutant stress may be set at a value that does not significantly increase the frequency or severity of all stresses combined. See also TSD, Appendix D. In addition, providing an allowable frequency for exceeding the criterion recognizes that it is not generally possible to assure that criteria are never exceeded. (TSD, page 36.)

Based on the available data, today's rule requires that the acute criterion for a pollutant be exceeded no more than once in three years on the average. EPA is also requiring that the chronic criterion for a pollutant be exceeded no more than once in three years on the average. EPA acknowledges that States may develop allowable frequencies that differ from these allowable frequencies, so long as they are scientifically supportable, but believes that these allowable frequencies are protective of the designated uses where EPA is promulgating criteria.

The use of aquatic life criteria for developing water quality-based effluent limits in permits requires the permitting official to use an appropriate wasteload allocation model. (TSD, Appendix D–6.) As discussed above, there are generally two methods for determining design flows, the hydrologically-based method and the biologically-based method.

The biologically-based method directly uses the averaging periods and frequencies specified in the aquatic life criteria for determining design flows. (TSD, Appendix. D–8.) Because the biologically-based method calculates the design flow directly from the duration and allowable frequency, it most accurately provides the allowed number of excursions. The hydrologically based method applies the CMC at a design flow equal to or equivalent to the 1Q10 design flow (i.e., the lowest one-day flow with an average recurrence frequency of once in ten years), and applies the CCC at the 7Q10 design flow (i.e., the lowest average seven consecutive day flow with a recurrence frequency of once in ten years).

EPA established a three year allowable frequency in the NTR. In settlement of the litigation on the NTR, EPA stated that it was in the midst of conducting, sponsoring, or planning research aimed at addressing scientific issues related to the basis for and application of water quality criteria and mentioned the issue of allowable frequency. See Partial Settlement Agreement in *American Forest and Paper Ass'n, Inc. et al.* v. *U.S. EPA* (Consolidated Case No. 93–0694 (RMU) D.D.C. To that end, EPA is reevaluating issues raised about allowable frequency as part of its work in revising the 1985 Guidelines.

EPA recognizes that additional data concerning (a) the probable frequency of lethal events for an assemblage of taxa covering a range of sensitivities to pollutants, (b) the probable frequency of sublethal effects for such taxa, (c) the differing effects of lethal and sublethal events in reducing populations of such taxa, and (d) the time needed to replace organisms lost as a result of toxicity, may lead to further refinement of the allowable frequency value. EPA has not yet completed this work. Until this work is complete, EPA believes that where EPA promulgates criteria, the three year allowable frequency represents a value in the reasonable range for this parameter.

3. Implementation

Once the applicable designated uses and water quality criteria for a water body are determined, under the National Pollutant Discharge Elimination System (NPDES) program discharges to the water body must be characterized and the permitting authority must determine the need for permit limits. If a discharge causes, has the reasonable potential to cause, or contributes to an excursion of a numeric or narrative water quality criteria, the permitting authority must develop permit limits as necessary to meet water quality standards. These permit limits are water quality-based effluent limitations or WQBELs. The terms "cause," "reasonable potential to cause," and "contribute to" are the terms in the NPDES regulations for conditions under which water quality-based permit limits are required. See 40 CFR 122.44(d)(1).

Since the publication of the proposed CTR, the State of California adopted procedures which detail how water quality criteria will be implemented through NPDES permits, waste discharge requirements, and other regulatory approaches. These procedures entitled, *Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California* were adopted on March 2, 2000. Once these procedures are submitted for review under CWA section 303(c), EPA will review them as they relate to water quality standards, and approve or disapprove them.

Several commenters understood the language in the preamble to the proposed rule regarding implementation

to mean that site-specific criteria, variances, and other actions would be prohibited or severely limited by the CTR. Site-specific criteria, variances and other actions modifying criteria are neither prohibited nor limited by the CTR. The State, if it so chooses, still can make these changes to its water quality standards, subject to EPA approval. However, with this Federal rule in effect, the State cannot implement any modifications that are less stringent than the CTR without an amendment to the CTR to reflect these modifications. EPA will make every effort to expeditiously accommodate Federal rulemaking of appropriate modifications to California's water quality standards. In the preamble to the proposed CTR, and here today, EPA is emphasizing that these efforts to amend the CTR on a case-by-case basis will generally increase the time before a modification can be implemented.

4. Wet Weather Flows

EPA has for a longtime maintained that CWA section 301(b)(1)(C) applies to NPDES permits for discharges from municipal separate storm sewer systems. Recently, the U.S. Court of Appeals for the Ninth Circuit upheld NPDES permits issued by EPA for five Arizona municipal separate storm sewer systems and addressed this issue specifically. *Defenders of Wildlife, et al.* v. *Browner,* No. 98–71080 (9th Cir., October 1999). The Court held that the CWA does not require "strict compliance" with State water quality standards for municipal storm sewer permits under section 301(b)(1)(C), but that at the same time, the CWA does give EPA discretion to incorporate appropriate water quality-based effluent limitations under another provision, CWA section 402(p)(3)(B)(iii).

The Court based its decision on the structure of section 402(p)(3), which contains distinct language for discharges of industrial storm water and municipal storm water. In section 402(p)(3)(A), Congress requires that "dischargers associated with industrial activity shall meet all applicable provisions of [section 402] and section [301]." 33 U.S.C. section 1342(p)(3)(A). The Court noted, therefore, that by incorporation, industrial storm water discharges need to achieve "any more stringent limitation, including those necessary to meet water quality standards * * *" The Court explained that industrial storm water discharges "must comply strictly with State water quality standards" but that Congress chose not to include a similar provision for municipal storm sewer discharges, including instead a requirement for controls to reduce pollutants to the maximum extent practicable or MEP standard in section 402(p)(3)(B). Reading the two related sections together, the Court concluded that section 402(p)(3)(B)(iii) does not require "strict compliance" by municipal storm sewer discharges according to section 301(b)(1)(C). At the same time, however, the Court found that the language in CWA section 402(p)(3)(B)(iii) which states that permits for discharges from municipal storm sewers shall require "such other provisions as the Administrator of the state determines appropriate for the control of such pollutants" provides EPA with discretion to incorporate provisions lending to ultimate compliance with water quality standards.

EPA believes that compliance with water quality standards through the use of Best Management Practices (BMPs) is appropriate. EPA articulated its position on the use of BMPs in storm water permits in the policy memorandum entitled, "Interim Permitting Approach for Water Quality-Based Effluent Limitations In Storm Water Permits" which was signed by the Assistant Administrator for Water, Robert Perciasepe on August 1, 1996 (61 FR 43761, August 9, 1996). A copy of this memorandum is contained in the administrative record for today's rule. The policy affirms the use of BMPs as a means to attain water quality standards in municipal storm water permits, and embraces BMPs as an interim permitting approach.

The interim permitting approach uses BMPs in first-round storm water permits, and expanded or better-tailored BMPs in subsequent permits, where necessary, to provide for the attainment of water quality standards. In cases where adequate information exists to develop more specific conditions or limitations to meet water quality standards, these conditions or limitations are to be incorporated into storm water permits, as necessary and appropriate.

This interim permitting approach, however, only applies to EPA. EPA encourages the State to adopt a similar policy for municipal storm water permits. This interim permitting approach provides time, where necessary, to more fully assess the range of issues and possible options for the control of storm water discharges for the protection of water quality. More information on this issue is included in the response to comment document in response to specific storm water issues raised by commenters.

5. Schedules of Compliance

A compliance schedule refers to an enforceable sequence of interim requirements in a permit leading to ultimate compliance with water quality-based effluent limitations or WQBELs in accordance with the CWA. The authorizing compliance schedule provision authorizes, but does not require, the permit issuing authority in the State of California to include such compliance schedules in permits under appropriate circumstances. The State of California is authorized to administer the National Pollutant Discharge Elimination System (NPDES) program and may exercise its discretion when deciding if a compliance schedule is justified because of the technical or financial (or other) infeasibility of immediate compliance. An authorizing compliance schedule provision is included in today's rule because of the potential for existing dischargers to have new or more stringent effluent limitations for which immediate compliance would not be possible or practicable.

New and Existing Dischargers: The provision allows compliance schedules only for an "existing discharger" which is defined as any discharger which is not a "new California discharger." A "new California discharger" includes "any building, structure, facility, or installation from which there is, or may be, a 'discharge of pollutants', the construction of which commences after the effective date of this regulation." These definitions are modeled after the existing 40 CFR 122.2 definitions for parallel terms, but with a cut-off date modified to reflect this rule. Only "new California dischargers" are required to comply immediately upon commencement of discharge with effluent limitations derived from the criteria in this rule. For "existing dischargers" whose permits are reissued or modified to contain new or more stringent limitations based upon certain water quality requirements, the permit could allow up to five years, or up to the length of a permit, to comply with such limitations. The provision applies to new or more stringent effluent limitations based on the criteria in this EPA rule.

EPA has included "increasing dischargers" within the category of "existing dischargers" since "increasing dischargers" are existing facilities with a change—an increase—in their discharge. Such facilities may include those with seasonal variations. "Increasing dischargers" will already have treatment systems in place for their current discharge, thus, they have less

opportunity than a new discharger does to design and build a new treatment system which will meet new water quality-based requirements for their changed discharge. Allowing existing facilities with an increasing discharge a compliance schedule will avoid placing the discharger at a competitive disadvantage vis-a-vis other existing dischargers who are eligible for compliance schedules.

Today's rule does not prohibit the use of a short-term "shake down period" for new California dischargers as is provided for new sources or new dischargers in 40 CFR 122.29(d)(4). These regulations require that the owner or operator of (1) a new source; (2) a new discharger (as defined in 40 CFR 122.2) which commenced discharge after August 13, 1979; or (3) a recommencing discharger shall install and implement all pollution control equipment to meet the conditions of the permit before discharging. The facility must also meet all permit conditions in the shortest feasible time (not to exceed 90 days). This shake-down period is not a compliance schedule. This approach may be used to address violations which may occur during a new facility's start-up, especially where permit limits are water quality-based and biological treatment is involved.

The burden of proof to show the necessity of a compliance schedule is on the discharger, and the discharger must request approval from the permit issuing authority for a schedule of compliance. The discharger should submit a description of the minimum required actions or evaluations that must be undertaken in order to comply with the new or more restrictive discharge limits. Dates of completion for the required actions or evaluations should be included, and the proposed schedule should reflect the shortest practicable time to complete all minimum required actions.

Duration of Compliance Schedules: Today's rule provides that compliance schedules may provide for up to five years to meet new or more stringent effluent limitations in those limited circumstances where the permittee can demonstrate to the permit authority that an extended schedule is warranted. EPA's regulations at 122.47 require compliance with standards as soon as possible. This means that permit authorities should not allow compliance schedules where the permittee fails to demonstrate their necessity. This provision should not be considered a default compliance schedule duration for existing facilities.

In instances where dischargers wish to conduct toxicological studies, analyze results, and adopt and implement new or revised water quality-based effluent limitations, EPA believes that five years is sufficient time within which to complete this process. See the preamble to the proposed rule.

Under this rule, where a schedule of compliance exceeds one year, interim requirements are to be specified and interim progress reports are to be submitted at least annually to the permit issuing authority, in at least one-year time intervals.

The rule allows all compliance schedules to extend up to a maximum duration of five years, which is the maximum term of any NPDES permit. See 40 CFR 122.46. The discharger's opportunity to obtain a compliance schedule occurs when the existing permit for that discharge is issued, reissued or modified to contain more stringent limits based on the water quality criteria in today's rule. Such compliance schedules, however, cannot be extended to any indefinite point of time in the future because the compliance schedule provision in this rule will sunset on May 18, 2005. The sunset applies to the authorizing provision in today's rule (40 CFR 131.38(e)), not to individual schedules of compliance included in specific NPDES permits. Delays in reissuing expired permits (including those which continue in effect under applicable NPDES regulations) cannot indefinitely extend the period of time during which a compliance schedule is in effect. This would occur where the permit authority includes the single maximum five-year compliance schedule in a permit that is reissued just before the compliance schedule provision sunsets (having been previously issued without WQBELS using the rule's criteria on the eve of the effective date of this rule). Instead, the effect of the sunset provision is to limit the longest time period for compliance to ten years after the effective date of this rule.

EPA recognizes that where a permit is modified during the permit term, and the permittee needs the full five years to comply, the five-year schedule may extend beyond the term of the modified permit. In such cases, the rule allows for the modified permit to contain a compliance schedule with an interim limit by the end of the permit term. When the permit is reissued, the permit authority may extend the compliance schedule in the next permit, provided that, taking into account the amount of time allowed under the previous permit, the entire compliance schedule contained in the permit shall not exceed five years. Final permit limits and compliance dates will be included in the record for the permit. Final compliance dates must occur within five years from the date of permit issuance, reissuance, or modification, unless additional or less time is provided for by law.

EPA would prefer that the State adopt an authorizing compliance schedule provision but recognizes that the State may not be able to complete this action for some time after promulgation of the CTR. Thus, EPA has chosen to promulgate the rule with a sunset provision which states that the authorizing compliance schedule provision will cease or sunset on May 18, 2005. However, if the State Board adopts, and EPA approves, a statewide authorizing compliance schedule provision significantly prior to May 18, 2005, EPA will act to stay the authorizing compliance schedule provision in today's rule. Additionally, if a Regional Board adopts, and the State Board adopts and EPA approves, a Regional Board authorizing compliance schedule provision, EPA will act to stay today's provision for the appropriate or corresponding geographic region in California. At that time, the State Board's or Regional Board's authorizing compliance schedule provision will govern the ability of the State regulatory entity to allow a discharger to include a compliance schedule in a discharger's NPDES permit.

Antibacksliding: EPA wishes to address the potential concern over antibacksliding where revised permit limits based on new information are the result of the completion of additional studies. The Agency's interpretation of the CWA is that the antibacksliding requirements of section 402(o) of the CWA do not apply to revisions to effluent limitations made before the scheduled date of compliance for those limitations.

State Compliance Schedule Provisions: EPA supports the State in adopting a statewide provision independent of or as part of the effort to readopt statewide water quality control plans, or in adopting individual basin-wide compliance schedule provisions through its nine Regional Water Quality Control Boards (RWQCBs). The State and RWQCBs have broad discretion to adopt a provision, including discretion on reasonable lengths of time for final compliance with WQBELs. EPA recognizes that practical time frames within which to set interim goals may be necessary to achieve meaningful, long-term improvements in water quality in California.

At this time, two RWQCBs have adopted an authorizing compliance schedule provision as an amendment to

their respective Basin Plans during the Boards' last triennial review process. The Basin Plans have been adopted by the State and have come to EPA for approval. Thus, the Basin Plans' provisions are effective for the respective Basins. If and when EPA approves of either Regional Basin Plan, EPA will expeditiously act to amend the CTR, staying its compliance schedule provision, for the appropriate geographic region.

6. Changes From Proposed Rule

A few changes were made in the final rule from the proposal both as a result of the Agency's consideration of issues raised in public comments and Endangered Species Act consultation with the U.S. Fish and Wildlife Service (FWS) and U.S. National Marine Fisheries Service (NMFS). The important changes include: reserving the mercury aquatic life criteria; reserving the selenium freshwater acute aquatic life criterion; reserving the chloroform human health criteria; and adding a sunset provision to the authorizing compliance schedule provision. EPA also clarified that the CTR will not replace priority toxic pollutant criteria which were adopted by the San Francisco Regional Water Quality Control Board in its 1986 Basin Plan, adopted by the State Board, and approved by EPA; specifying the harmonic mean for human health criteria for non-carcinogens and adding a provision which explicitly allows the State to adopt and implement an alternative averaging period, frequency, and design flow for a criterion after opportunity for public comment.

The first two changes, the reservation of mercury criteria and selenium criterion, are discussed in more detail below in Section L., The Endangered Species Act (ESA). The selenium criterion is also discussed in more detail above in Section E., Derivation of Criteria, in subsection 2.b., Freshwater Acute Selenium Criterion. EPA has also decided to reserve a decision on numeric criteria for chloroform and therefore not promulgate chloroform criteria in the final rule. As part of a large-scale regulation promulgated in December 1998 under the Safe Drinking Water Act, EPA published a health-based goal for chloroform (the maximum contaminant level goal or MCLG) of zero, see 63 FR 69390, Dec. 16, 1998. EPA provided new data and analyses concerning chloroform for public review and comment, including a different, mode of action approach for estimating the cancer risk, 63 FR 15674, March 31, 1998, but did not reach a conclusion on how to use that new information in establishing the final MCLG, pending further review by the Science Advisory Board. EPA has now concluded that any further actions on water quality criteria should take into account the new data and analysis as reviewed by the SAB. This decision is consistent with a recent federal court decision vacating the MCLG for chloroform (*Chlorine Chemistry Council* v. *EPA*, No. 98–1627 (DC Cir., Mar. 31,2000)). EPA intends to reassess the human health 304(a) criteria recommendation for chloroform. For these reasons, EPA has decided to reserve a decision on numeric criteria for chloroform in the CTR and not promulgate water quality criteria as proposed. Permitting authorities in California should continue to rely on existing narrative criteria to establish effluent limitations as necessary for chloroform.

The sunset provision for the authorizing compliance schedule provision has been added to ease the transition from a Federal provision to the State's provision that was adopted in March 2000 as part of its' new statewide implementation plan. The sunset provision is discussed in more detail in Section G.5 of today's preamble. The CTR matrix at 40 CFR 131.38(b)(1) makes it explicit that the rule does not supplant priority toxic pollutant criteria which were adopted by the San Francisco Regional Water Quality Control Board in its 1986 Basin Plan, adopted by the State Board, and approved by EPA. This change is discussed more fully in Section D.4. of today's preamble. EPA modified the design flow for implementing human health criteria for non-carcinogens from a 30Q5 to a harmonic mean. Human health criteria for non-carcinogens are based on an RfD, which is an acceptable daily exposure over a lifetime. EPA matched the criteria for protection over a human lifetime with the longest stream flow averaging period, i.e., the harmonic mean. Lastly, the CTR now contains language which is intended to make it easier for the State to adopt and implement an alternative averaging period, frequency and related design flow, for situations where the default parameters are inappropriate. This language is found at 40 CFR 131.38(c)(2)(iv).

H. Economic Analysis

This final rule establishes ambient water quality criteria which, by themselves, do not directly impose economic impacts (see section K). These criteria combined with the State-adopted designated uses for inland surface waters, enclosed bays and estuaries, and implementation policies, will establish water quality standards. Until the State implements these water quality standards, there will be no effect of this rule on any entity. The State will implement these criteria by ensuring that NPDES permits result in discharges that will meet these criteria. In so doing, the State will have considerable discretion.

EPA has analyzed the indirect potential costs and benefits of this rule. In order to estimate the indirect costs and benefits of the rule, an appropriate baseline must be established. The baseline is the starting point for measuring incremental costs and benefits of a regulation. The baseline is established by assessing what would occur in the absence of the regulation. At present, State Basin Plans contain a narrative water quality criterion stating that all waters shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life. EPA's regulation at 40 CFR 122.44(d)(1)(vi) requires that where a discharge causes or has the reasonable potential to cause an excursion above a narrative criterion within a State water quality standard, the permitting authority must establish effluent limits but may determine limits using a number of options. These options include establishing "effluent limits on a case-by-case basis, using EPA's water quality criteria published under section 304(a) of the CWA, supplemented where necessary by other relevant information" (40 CFR 122.44(d)(1)(vi)(B)). Thus, to the extent that the State is implementing its narrative criteria by applying the CWA section 304(a) criteria, this rule does not impose any incremental costs because the criteria in this rule are identical to the CWA section 304(a) criteria. Alternatively, to the extent that the State is implementing its narrative criteria on a "case-by-case basis" using "other relevant information" in its permits this rule may impose incremental indirect costs because the criteria in these permits may not be based on CWA 304(a) criteria. Both of these approaches to establishing effluent limits are in full compliance with the CWA.

Because a specific basis for effluent limits in all existing permits in California is not known, it is not possible to determine a precise estimate of the indirect costs of this rule. The incremental costs of the rule may be as low as zero, or as high as $61 million. The high estimate of costs is based on the possibility that most of the effluent limits now in effect are not based on 304(a) criteria. EPA evaluated these

indirect costs using two different approaches. The first approach uses existing discharge data and makes assumptions about future State NPDES permit limits. Actual discharge levels are usually lower than the level set by current NPDES permit limits. This approach, representing the low-end scenario, also assumes that some of the discretionary mechanisms that would enhance flexibility (*e.g.*, site specific criteria, mixing zones) would be granted by the State. The second approach uses a sample of existing permit limits and assumes that dischargers are actually discharging at the levels contained in their permits and makes assumptions about limits statewide that would be required under the rule. This approach, representing the high-end scenario, also assumes that none of the discretionary mechanisms that would enhance flexibility (*e.g.*, site specific criteria, mixing zones) would be granted by the State. These two approaches recognize that the State has significant flexibility and discretion in how it chooses to implement standards within the NPDES permit program, the EA by necessity includes many assumptions about how the State will implement the water quality standards. These assumptions are based on a combination of EPA guidance and current permit conditions for the facilities examined in this analysis. To account for the uncertainty of EPA's implementation assumptions, this analysis estimates a wide range of costs and benefits. By completing the EA, EPA intends to inform the public about how entities might be potentially affected by State implementation of water quality standards in the NPDES permit program. The costs and benefits sections that follow summarize the methodology and results of the analysis.

1. Costs

EPA assessed the potential compliance costs that facilities may incur to meet permit limits based on the criteria in today's rule. The analysis focused on direct compliance costs such as capital costs and operation and maintenance costs (O&M) for end-of-pipe pollution control, indirect source controls, pollution prevention, monitoring, and costs of pursuing alternative methods of compliance.

The population of facilities with NPDES permits that discharge into California's enclosed bays, estuaries and inland surface waters includes 184 major dischargers and 1,057 minor dischargers. Of the 184 major facilities, 128 are publicly owned treatment works (POTWs) and 56 are industrial facilities. Approximately 2,144 indirect dischargers designated as significant industrial users discharge wastewater to those POTWs. In the EA for the proposed CTR, EPA used a three-phased process to select a sample of facilities to represent California dischargers potentially affected by the State's implementation of permit limits based on the criteria contained in this rule.

The first phase consisted of choosing three case study areas for which data was thought to exist. The three case studies with a total of 5 facilities included: the South San Francisco Bay (the San Jose/Santa Clara Water Pollution Control Plant and Sunnyvale Water Pollution Control Plant); the Sacramento River (the Sacramento Regional Wastewater Treatment Plant); and the Santa Ana River (the City of Riverside Water Quality Control Plant and the City of Colton Municipal Wastewater Treatment Facility). The second phase consisted of selecting five additional major industrial dischargers to complement the case-study POTWs.

The third phase involved selecting 10 additional facilities to improve the basis for extrapolating the costs of the selected sample facilities to the entire population of potentially affected dischargers. The additional 10 facilities were selected such that the group examined: (1) Was divided between major POTWs and major industrial discharger categories in proportion to the numbers of facilities in the State; (2) gave greater proportionate representation to major facilities than minor facilities based on a presumption that the majority of compliance costs would be incurred by major facilities; (3) gave a proportionate representation to each of four principal conventional treatment processes typically used by facilities in specified industries in California; and (4) was representative of the proportionate facilities located within the different California Regional Water Quality Control Boards. Within these constraints, facilities were selected at random to complete the sample.

In the EA for today's final rule, EPA primarily used the same sample as the EA for the proposed rule with some modifications. EPA increased the number of minor POTWs and minor industrial facilities in the sample. EPA randomly selected four new minor POTW facilities and five new minor industrial facilities to add to the sample. The number of sample facilities selected in each area under the jurisdiction of a Regional Water Quality Control Board was roughly proportional to the universe of facilities in each area.

For those facilities that were projected to exceed permit limits based on the criteria, EPA estimated the incremental costs of compliance. Using a decision matrix or flow chart, costs were developed for two different scenarios—a "low-end" cost scenario and a "high-end" cost scenario—to account for a range of regulatory flexibility available to the State when implementing permit limits based on the water quality criteria. The assumptions for baseline loadings also vary over the two scenarios. The low-end scenario generally assumed that facilities were discharging at the maximum effluent concentrations taken from actual monitoring data, while the high-end scenario generally assumed that facilities were discharging at their current effluent limits. The decision matrix specified assumptions used for selection of control options, such as optimization of existing treatment processes and operations, in-plant pollutant minimization and prevention, and end-of-pipe treatment.

The annualized potential costs that direct and indirect dischargers may incur as a result of State implementation of permit limits based on water quality standards using today's criteria are estimated to be between $33.5 million and $61 million. EPA believes that the costs incurred as a result of State implementation of these permit limits will approach the low-end of the cost range. Costs are unlikely to reach the high-end of the range because State authorities are likely to choose implementation options that provide some degree of flexibility or relief to point source dischargers. Furthermore, cost estimates for both scenarios, but especially for the high-end scenario, may be overstated because the analysis tended to use conservative assumptions in calculating these permit limits and in establishing baseline loadings. The baseline loadings for the high-end were based on current effluent limits rather than actual pollutant discharge data. Most facilities discharge pollutants in concentrations well below current effluent limits. In addition, both the high-end and low-end cost estimates in the EA may be slightly overstated since potential costs incurred to reduce chloroform discharges were included in these estimates. EPA made a decision to reserve the chloroform human health criteria after the EA was completed.

Under the low-end cost scenario, major industrial facilities and POTWs would incur about 27 percent of the potential costs, indirect dischargers would incur about 70 percent of the potential costs, while minor dischargers would incur about 3 percent. Of the major direct dischargers, POTWs would incur the largest share of projected costs (87 percent). However, distributed

among 128 major POTWs in the State, the average cost per plant would be $61,000 per year. Chemical and petroleum industries would incur the highest cost of the industrial categories (5.6 percent of the annual costs, with an annual average of $25,200 per plant). About 57 percent of the low-end costs would be associated with pollution prevention activities, while nearly 38 percent would be associated with pursuing alternative methods of compliance under the regulations.

Under the high-end cost scenario, major industrial facilities and POTWs would incur about 94 percent of the potential costs, indirect dischargers would incur about 17 percent of the potential costs, while minor dischargers would incur about 5 percent. Among the major, direct dischargers, two categories would incur the majority of potential costs—major POTWs (82 percent), Chemical/Petroleum Products (9 percent). The average annual per plant cost for different industry categories would ranges from zero to $324,000. The two highest average cost categories would be major POTWs ($324,000 per year) and Chemical/Petroleum Products ($221,264 per year). The shift in proportion of potential costs between direct and indirect dischargers is due to the assumption that more direct dischargers would use end-of-pipe treatment under the high-end scenario. Thus, a smaller proportion of indirect dischargers would be impacted under the high-end scenario, since some municipalities are projected to add end-of-pipe treatment which would reduce the need for controls from indirect discharges. Over 91 percent of the annual costs are for waste minimization and treatment optimization costs. Waste minimization would represent nearly 84% of the total annual costs. Capital and operation and maintenance costs would make up less than 9 percent of annual costs.

Cost-Effectiveness: Cost-effectiveness is estimated in terms of the cost of reducing the loadings of toxic pollutants from point sources. The cost-effectiveness is derived by dividing the projected annual costs of implementing permit limits based on water quality standards using today's criteria by the toxicity-weighted pounds (pound-equivalents) of pollutants removed. Pound-equivalents are calculated by multiplying pounds of each pollutant removed by the toxic weight (based on the toxicity of copper) for that pollutant.

Based on this analysis, State implementation of permit limits based on today's criteria would be responsible for the reduction of about 1.1 million to 2.7 million toxic pound-equivalents per year, or 15 to 50 percent of the toxic-weighted baseline loadings for the high- and low-end scenarios, respectively. The cost-effectiveness of the scenarios would range from $22 (high-end scenario) to $31 (low-end scenario) per pound-equivalent.

2. Benefits

The benefits analysis is intended to provide insight into both the types and potential magnitude of the economic benefits expected as a result of implementation of water quality standards based on today's criteria. To the extent feasible, empirical estimates of the potential magnitude of the benefits were developed and then compared to the estimated costs of implementing water quality standards based on today's criteria.

To perform a benefits analysis, the types or categories of benefits that apply need to be defined. EPA relied on a set of benefits categories that typically apply to changes in the water resource environment. Benefits were categorized as either use benefits or passive (nonuse) benefits depending on whether or not they involve direct use of, or contact with, the resource. The most prominent use benefit categories are those related to recreational fishing, boating, and swimming. Another use benefit category of significance is human health risk reduction. Human health risk reductions can be realized through actions that reduce human exposure to contaminants such as exposure through the consumption of fish containing elevated levels of pollutants. Passive use benefits are those improvements in environmental quality that are valued by individuals apart from any use of the resource in question.

Benefits estimates were derived in this study using an approach in which benefits of discrete large-scale changes in water quality beyond present day conditions were estimated wherever feasible. A share of those benefits was then apportioned to implementation of water quality standards based on today's criteria. The apportionment estimate was based on a three-stage process:

First, EPA assessed current total loadings from all sources that are contributing to the toxics-related water quality problems observed in the State. This defines the overall magnitude of loadings. Second, the share of total loadings that are attributable to sources that would be controlled through implementation of water quality standards based on today's criteria was estimated. Since this analysis was designed to focus only on those controls imposed on point sources, this stage of the process entailed estimating the portion of total loadings originating from point sources. Third, the percentage reduction in loadings expected due to implementation of today's criteria was estimated and then multiplied by the share of point source loadings to calculate the portion of benefits that could be attributed to implementation of water quality standards based on today's criteria.

Total monetized annual benefits were estimated in the range of $6.9 to $74.7 million. By category, annual benefits would be $1.3 to $4.6 million for avoided cancer risk, $2.2 to $15.2 million for recreational angling, and $3.4 to $54.9 million for passive use benefits.

There are numerous categories of potential or likely benefits that have been omitted from the quantified and monetized benefit estimates. In terms of potential magnitudes of benefit, the following are likely to be significant contributors to the underestimation of the monetized values presented above:

- Improvements in water-related (in-stream and near stream) recreation apart from fishing. The omission of potential motorized and nonmotorized boating, swimming, picnicking, and related in-stream and stream-side recreational activities from the benefits estimates could contribute to an appreciable underestimation of total benefits. Such recreational activities have been shown in empirical research to be highly valued, and even modest changes in participation and or user values could lead to sizable benefits statewide. Some of these activities can be closely associated with water quality attributes (notably, swimming). Other recreational activities may be less directly related to the water quality improvements, but might nonetheless increase due to their association with fishing, swimming, or other activities in which the participants might engage.
- Improvements in consumptive and nonconsumptive land-based recreation, such as hunting and wildlife observation. Improvements in aquatic habitats may lead (via food chain and related ecologic benefit mechanisms) to healthier, larger, and more diverse populations of avian and terrestrial species, such as waterfowl, eagles, and otters. Improvements in the populations for these species could manifest as improved hunting and wildlife viewing opportunities, which might in turn increase participation and user day values for such activities. Although the scope of the benefits analysis has not allowed a quantitative assessment of these values at either pre- or post-rule

conditions, it is conceivable that these benefits could be appreciable.

• Improvements in human health resulting from reduction of non-cancer risk. EPA estimated that implementation of water quality standards based on the criteria would result in a reduction of mercury concentrations in fish tissue and, thus, a reduction in the hazard from consumption of mercury contaminated fish. However, EPA was unable to monetize benefits due to reduced non-cancer health effects.

• Human health benefits for saltwater anglers outside of San Francisco Bay were not estimated. The number of saltwater anglers outside of San Francisco Bay is estimated to be 673,000 (based on Huppert, 1989, and U.S. FWS, 1993). The omission of other saltwater anglers may cause human health benefits to be underestimated. In addition, benefit estimates in the EA may be slightly overstated since potential benefits from reductions in chloroform discharges were included in these estimates. EPA made a decision to reserve the chloroform human health criteria after the EA was completed.

EPA received a number of comments which requested the Agency use the cost-benefit analysis in the EA as a factor in setting water quality criteria. EPA does not use the EA as a basis in determining protective water quality criteria. EPA's current regulations at 40 CFR 131.11 state that the criteria must be based on sound scientific rationale and must protect the designated use. From the outset of the water quality standards program, EPA has explained that while economic factors may be considered in designating uses, they may not be used to justify criteria that are not protective of those uses. 44 FR 25223–226, April 30, 1979. See e.g. *Mississippi Commission on Natural Resources* v. *Costle,* 625 F. 2d 1269, 1277 (5th Cir. 1980). EPA reiterated this interpretation of the CWA and its implementing regulations in discussing section 304(a) recommended criteria guidance stating that "they are based solely on data and scientific judgments on the relationship between pollutant concentrations and environmental and human health effects and do not reflect consideration of economic impacts or the technological feasibility of meeting the chemical concentrations in ambient water." 63 FR 36742 and 36762, July 7, 1998.

I. Executive Order 12866, Regulatory Planning and Review

Under Executive Order 12866 (58 FR 51735, October 4, 1993), the Agency must determine whether the regulatory action is "significant" and therefore subject to Office of Management and Budget (OMB) review and the requirements of the Executive Order. The Order defines "significant regulatory action" as one that is likely to result in a rule that may:

(1) Have an annual effect on the economy of $100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or State, local, or tribal governments or communities;

(2) Create a serious inconsistency or otherwise interfere with an action taken or planned by another Agency;

(3) Materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of recipients thereof; or

(4) Raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in the Executive Order.

It has been determined that this rule is not a "significant regulatory action" under the terms of Executive Order 12866 and is therefore not subject to OMB review.

J. Unfunded Mandates Reform Act of 1995

Title II of the Unfunded Mandates Reform Act of 1995 (UMRA), Public Law 104–4, establishes requirements for Federal agencies to assess the effects of their regulatory actions on State, local, and tribal governments and the private sector. Under section 202 of the UMRA, EPA generally must prepare a written statement, including a cost-benefit analysis, for proposed and final rules with "Federal mandates" that may result in expenditures to State, local, and tribal governments, in the aggregate, or to the private sector, of $100 million or more in any one year. Before promulgating any regulation for which a written statement is needed, section 205 of the UMRA generally requires EPA to identify and consider a reasonable number of regulatory alternatives and adopt the least costly, most cost-effective or least burdensome alternative that achieves the objectives of the rule. The provisions of section 205 do not apply when they are inconsistent with applicable law. Moreover, section 205 allows an Agency to adopt an alternative other than the least costly, most cost-effective or least burdensome alternative if the Administrator publishes with the final rule an explanation why that alternative was not adopted. Before EPA establishes any regulatory requirements that may significantly or uniquely affect small governments, including tribal governments, it must have developed under section 203 of the UMRA a small government Agency plan. The plan must provide for notifying potentially affected small governments, enabling officials of the affected small governments to have meaningful and timely input in the development of regulatory proposals with significant Federal intergovernmental mandates, and EPA informing, educating, and advising small governments on compliance with the regulatory requirements.

Today's rule contains no Federal mandates (under the regulatory provisions of Title II of the Unfunded Mandates Reform Act (UMRA)) for State, local, or tribal governments or the private sector. Today's rule imposes no enforceable duty on any State, local or Tribal governments or the private sector; rather, the CTR promulgates ambient water quality criteria which, when combined with State-adopted uses, will create water quality standards for those water bodies with adopted uses. The State will then use these resulting water quality standards in implementing its existing water quality control programs. Thus, today's rule is not subject to the requirements of sections 202 and 205 of the UMRA.

EPA has determined that this rule contains no regulatory requirements that might significantly or uniquely affect small governments. This rule establishes ambient water quality criteria which, by themselves do not directly impact any entity. The State will implement these criteria by ensuring that NPDES permits result in discharges that will meet these criteria. In so doing, the State will have considerable discretion. Until the State implements these water quality standards, there will be no effect of this rule on any entity. Thus, today's rule is not subject to the requirements of section 203 of UMRA.

K. Regulatory Flexibility Act

The Regulatory Flexibility Act generally requires Federal agencies to prepare a regulatory flexibility analysis of any rule subject to notice and comment rulemaking requirements under the Administrative Procedure Act or any other statute unless the Agency certifies that the rule will not have a significant economic impact of a substantial number of small entities. Small entities include small businesses, small organizations, and small governmental jurisdictions. For purposes of assessing the impacts of today's rule on small entities, small entity is defined as: (1) A small business according to RFA default definitions for small businesses (based on SBA size

standards); (2) a small governmental jurisdiction that is a government of a city, county, town, school district or special district with a population of less than 50,000; and (3) a small organization that is any not-for-profit enterprise which is independently owned and operated and is not dominant in its field.

After considering the economic impacts of today's final rule on small entities, I certify that this action will not have a significant economic impact on a substantial number of small entities. This final rule will not impose any requirements on small entities.

Under the CWA water quality standards program, States must adopt water quality standards for their waters that must be submitted to EPA for approval. If the Agency disapproves a State standard and the State does not adopt appropriate revisions to address EPA's disapproval, EPA must promulgate standards consistent with the statutory requirements. EPA has authority to promulgate criteria or standards in any case where the Administrator determines that a revised or new standard is necessary to meet the requirements of the Act. These State standards (or EPA-promulgated standards) are implemented through various water quality control programs including the National Pollutant Discharge Elimination System (NPDES) program that limits discharges to navigable waters except in compliance with an EPA permit or permit issued under an approved State NPDES program. The CWA requires that all NPDES permits must include any limits on discharges that are necessary to meet State water quality standards.

Thus, under the CWA, EPA's promulgation of water quality criteria or standards establishes standards that the State, in turn, implements through the NPDES permit process. The State has considerable discretion in deciding how to meet the water quality standards and in developing discharge limits as needed to meet the standards. In circumstances where there is more than one discharger to a water body that is subject to water quality standards or criteria, a State also has discretion in deciding on the appropriate limits for the different dischargers. While the State's implementation of federally-promulgated water quality criteria or standards may result indirectly in new or revised discharge limits for small entities, the criteria or standards themselves do not apply to any discharger, including small entities.

Today's rule, as explained above, does not itself establish any requirements that are applicable to small entities. As a result of EPA's action here, the State of California will need to ensure that permits it issues include limits as necessary to meet the water quality standards established by the criteria in today's rule. In so doing, the State will have a number of discretionary choices associated with permit writing. While California's implementation of today's rule may ultimately result in some new or revised permit conditions for some dischargers, including small entities, EPA's action today does not impose any of these as yet unknown requirements on small entities.

The RFA requires analysis of the economic impact of a rule only on the small entities subject to the rule's requirements. Courts have consistently held that the RFA imposes no obligation on an Agency to prepare a small entity analysis of the effect of a rule on entities not regulated by the rule. *Motor & Equip. Mrfrs. Ass'n* v. *Nichols*, 142 F.3d 449, 467 & n.18 (D.C. Cir. 1998)(quoting *United States Distribution Companies* v. *FERC*, 88 F.3d 1105, 1170 (D.C. Cir. 1996); see also *American Trucking Association, Inc.* v. *EPA*, 175 F.3d 1027 (D.C. Cir. 1999). This final rule will have a direct effect only on the State of California which is not a small entity under the RFA. Thus, individual dischargers, including small entities, are not directly subject to the requirements of the rule. Moreover, because of California's discretion in implementing these standards, EPA cannot assess the extent to which the promulgation of this rule may subsequently affect any dischargers, including small entities. Consequently, certification under section 605(b) is appropriate. *State of Michigan, et al.* v. *U.S. Environmental Protection Agency*, No. 98–1497 (D.C. Cir. Mar. 3, 2000), slip op. at 41–42.

L. Paperwork Reduction Act

This action requires no new or additional information collection, reporting, or record keeping subject to the Paperwork Reduction Act, 44 U.S.C. 3501 *et seq.*

M. Endangered Species Act

Pursuant to section 7(a) of the Endangered Species Act (ESA), EPA has consulted with the U.S. Fish and Wildlife Service and the U.S. National Marine Fisheries Service (collectively, the Services) concerning EPA's rulemaking action for the State of California. EPA initiated informal consultation in early 1994, and completed formal consultation in April 2000. As a result of the consultation, EPA modified some of the provisions in the final rule.

As part of the consultation process, EPA submitted to the Services a Biological Evaluation for their review in October of 1997. This evaluation found that the proposed CTR was not likely to jeopardize the continued existence of any Federally listed species or result in the destruction or adverse modification of designated critical habitat. In April of 1998, the Services sent EPA a draft Biological Opinion which tentatively found that EPA's proposed rule would jeopardize the continued existence of several Federally listed species and result in the destruction or have adverse effect on designated critical habitat. After lengthy discussions with the Services, EPA agreed to several changes in the final rule and the Services in turn issued a final Biological Opinion finding that EPA's action would not likely jeopardize the continued existence of any Federally listed species or result in the destruction or adverse modification of designated critical habitat. EPA's Biological Evaluation and the Services' final Biological Opinion are contained in the administrative record for today's rule.

In order to ensure the continued protection of Federally listed threatened and endangered species and to protect their critical habitat, EPA agreed to reserve the aquatic life criteria for mercury and the acute freshwater aquatic life criterion for selenium. The Services believe that EPA's proposed criteria are not sufficiently protective of Federally listed species and should not be promulgated. EPA agreed that it would reevaluate these criteria in light of the Services concerns before promulgating them for the State of California. Other commitments made by EPA are described in a letter to the Services dated December 16, 1999; this letter is contained in the administrative record for today's rule.

N. Congressional Review Act

The Congressional Review Act, 5 U.S.C. 801 *et seq.*, as added by the Small Business Regulatory Enforcement Fairness Act of 1996, generally provides that before a rule may take effect, the Agency promulgating the rule must submit a rule report, which includes a copy of the rule, to each House of the Congress and to the Comptroller General of the United States. EPA will submit a report containing this rule and other required information to the U.S. Senate, the U.S. House of Representatives, and the Comptroller General of the United States prior to publication of the rule in the **Federal Register**. A major rule cannot take effect until 60 days after it is published in the **Federal Register**. This rule is not a major rule as defined

by 5 U.S.C. 804(2). This rule will be effective May 18, 2000.

O. Executive Order 13084, Consultation and Coordination With Indian Tribal Governments

Under Executive Order 13084, EPA may not issue a regulation that is not required by statute, that significantly or uniquely affects the communities of Indian tribal governments, and that imposes substantial direct compliance costs on those communities, unless the Federal government provides the funds necessary to pay the direct compliance costs incurred by the tribal governments, or EPA consults with those governments. If EPA complies by consulting, Executive Order 13084 requires EPA to provide to the Office of Management and Budget, in a separately identified section of the preamble to the rule, a description of the extent of EPA's prior consultation with representatives of affected tribal governments, a summary of the nature of their concerns, and a statement supporting the need to issue the regulation. In addition, Executive Order 13084 requires EPA to develop an effective process permitting elected officials and other representatives of Indian tribal governments "to provide meaningful and timely input in the development of regulatory policies on matters that significantly or uniquely affect their communities."

Today's rule does not significantly or uniquely affect the communities of Indian tribal governments nor does it impose substantial direct compliance cots on them. Today's rule will only address priority toxic pollutant water quality criteria for the State of California and does not apply to waters in Indian country. Accordingly, the requirements of section 3(b) of Executive Order 13084 do not apply to this rule.

P. National Technology Transfer and Advancement Act

Section 12(d) of the National Technology Transfer and Advancement Act of 1995 ("NTTAA"), Public Law No. 104–113, section 12(d) (15 U.S.C. 272 note) directs EPA to use voluntary consensus standards in its regulatory activities unless to do so would be inconsistent with applicable law or otherwise impractical. Voluntary consensus standards are technical standards (e.g., materials specifications, test methods, sampling procedures, and business practices) that are developed or adopted by voluntary consensus standards bodies. The NTTAA directs EPA to provide Congress, through OMB, explanations when the Agency decides not to use available and applicable voluntary consensus standards.

This final rule does not involve technical standards. Therefore, EPA did not consider the use of any voluntary consensus standards.

Q. Executive Order 13132 on Federalism

Executive Order 13132, entitled "Federalism" (64 FR 43255, August 10, 1999), requires EPA to develop an accountable process to ensure "meaningful and timely input by State and local officials in the development of regulatory policies that have federalism implications." "Policies that have federalism implications" is defined in the Executive Order to include regulations that have "substantial direct effects on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government."

Under section 6 of Executive Order 13132, EPA may not issue a regulation that has federalism implications, that imposes substantial direct compliance costs, and that is not required by statute, unless the Federal government provides the funds necessary to pay the direct compliance costs incurred by State and local governments, or EPA consults with State and local officials early in the process of developing the proposed regulation. EPA also may not issue a regulation that has federalism implications and that preempts State law, unless the Agency consults with State and local officials early in the process of developing the proposed regulation.

This final rule does not have federalism implications. It will not have substantial direct effects on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government, as specified in Executive Order 13132. The rule does not affect the nature of the relationship between EPA and States generally, for the rule only applies to water bodies in California. Further, the rule will not substantially affect the relationship of EPA and the State of California, or the distribution of power or responsibilities between EPA and the State. The rule does not alter the State's authority to issue NPDES permits or the State's considerable discretion in implementing these criteria. The rule simply implements Clean Water Act section 303(c)(2)(B) requiring numeric ambient water quality criteria for which EPA has issued section 304(a) recommended criteria in a manner that is consistent with previous regulatory guidance that the Agency has issued to implement CWA section 303(c)(2)(B). Further, this rule does not preclude the State from adopting water quality standards that meet the requirements of the CWA. Thus, the requirements of section 6 of the Executive Order do not apply to this rule.

Although section 6 of Executive Order 13132 does not apply to this rule, EPA did consult with State and local government representatives in developing this rule. EPA and the State reached an agreement that to best utilize its respective resources, EPA would promulgate water quality criteria and the State would concurrently work on a plan to implement the criteria. Since the proposal of this rule, EPA has kept State officials fully informed of changes to the proposal. EPA has continued to invite comment from the State on these changes. EPA believes that the final CTR incorporates comments from State officials and staff.

R. Executive Order 13045 on Protection of Children From Environmental Health Risks and Safety Risks

Executive Order 13045: "Protection of Children from Environmental Health Risks and Safety Risks" (62 FR 19885, April 23, 1997) applies to any rule that: (1) Is determined to be "economically significant" as defined under Executive Order 12866, and (2) concerns an environmental health or safety risk that EPA has reason to believe may have a disproportionate effect on children. If the regulatory action meets both criteria, the Agency must evaluate the environmental health or safety effects of the planned rule on children, and explain why the planned regulation is preferable to other potentially effective and reasonably feasible alternatives considered by the Agency.

While this final rule is not subject to the Executive Order because it is not economically significant as defined in Executive Order 12866, we nonetheless have reason to believe that the environmental health or safety risk addressed by this action may have a disproportionate effect on children. As a matter of EPA policy, we therefore have assessed the environmental health or safety effects of ambient water quality criteria on children. The results of this assessment are contained in section F.3., Human Health Criteria.

List of Subjects in 40 CFR Part 131

Environmental protection, Indians—lands, Intergovernmental relations, Reporting and recordkeeping requirements, Water pollution control.

Dated: April 27, 2000.

Carol Browner,

Administrator.

For the reasons set out in the preamble, part 131 of chapter I of title 40 of the Code of Federal Regulations is amended as follows:

PART 131—WATER QUALITY STANDARDS

1. The authority citation for part 131 continues to read as follows:

Authority: 33 U.S.C. 1251 *et seq.*

Subpart D—[Amended]

2. Section 131.38 is added to subpart D to read as follows:

§ 131.38 Establishment of Numeric Criteria for Priority Toxic Pollutants for the State of California.

(a) *Scope.* This section promulgates criteria for priority toxic pollutants in the State of California for inland surface waters and enclosed bays and estuaries. This section also contains a compliance schedule provision.

(b)(1) Criteria for Priority Toxic Pollutants in the State of California as described in the following table:

BILLING CODE 6560–50–P

A		B Freshwater		C Saltwater		D Human Health (10^{-6} risk for carcinogens) For consumption of:	
# Compound	CAS Number	Criterion Maximum Conc. [d] B1	Criterion Continuous Conc. [d] B2	Criterion Maximum Conc. [d] C1	Criterion Continuous Conc. [d] C2	Water & Organisms (μg/L) D1	Organisms Only (μg/L) D2
1. Antimony	7440360					14 a,s	4300 a,t
2. Arsenic [b]	7440382	340 i,m,w	150 i,m,w	69 i,m	36 i,m		
3. Beryllium	7440417					n	n
4. Cadmium [b]	7440439	4.3 e,i,m,w,x	2.2 e,i,m,w	42 i,m	9.3 i,m	n	n
5a. Chromium (III)	16065831	550 e,i,m,o	180 e,i,m,o			n	n
5b. Chromium (VI) [b]	18540299	16 i,m,w	11 i,m,w	1100 i,m	50 i,m	n	n
6. Copper [b]	7440508	13 e,i,m,w,x	9.0 e,i,m,w	4.8 i,m	3.1 i,m	1300	
7. Lead [b]	7439921	65 e,i,m	2.5 e,i,m	210 i,m	8.1 i,m	n	n
8. Mercury [b]	7439976	[Reserved]	[Reserved]	[Reserved]	[Reserved]	0.050 a	0.051 a
9. Nickel [b]	7440020	470 e,i,m,w	52 e,i,m,w	74 i,m	8.2 i,m	610 a	4600 a
10. Selenium [b]	7782492	[Reserved] p	5.0 q	290 i,m	71 i,m	n	n
11. Silver [b]	7440224	3.4 e,i,m		1.9 i,m			
12. Thallium	7440280					1.7 a,s	6.3 a,t
13. Zinc [b]	7440666	120 e,i,m,w,x	120 e,i,m,w	90 i,m	81 i,m		
14. Cyanide [b]	57125	22 o	5.2 o	1 r	1 r	700 a	220,000 a,j
15. Asbestos	1332214					7,000,000 fibers/L k,s	
16. 2,3,7,8-TCDD (Dioxin)	1746016					0.000000013 c	0.000000014 c
17. Acrolein	107028					320 s	780 t
18. Acrylonitrile	107131					0.059 a,c,s	0.66 a,c,t
19. Benzene	71432					1.2 a,c	71 a,c
20. Bromoform	75252					4.3 a,c	360 a,c
21. Carbon Tetrachloride	56235					0.25 a,c,s	4.4 a,c,t
22. Chlorobenzene	108907					680 a,s	21,000 a,j,t
23. Chlorodibromomethane	124481					0.401 a,c	34 a,c
24. Chloroethane	75003						
25. 2-Chloroethylvinyl Ether	110758						

26. Chloroform	67663					[Reserved]	[Reserved]
27. Dichlorobromomethane	75274					0.56 a,c	46 a,c
28. 1,1-Dichloroethane	75343						
29. 1,2-Dichloroethane	107062					0.38 a,c,s	99 a,c,t
30. 1,1-Dichloroethylene	75354					0.057 a,c,s	3.2 a,c,t
31. 1,2-Dichloropropane	78875					0.52 a	39 a
32. 1,3-Dichloropropylene	542756					10 a,s	1,700 a,t
33. Ethylbenzene	100414					3,100 a,s	29,000 a,t
34. Methyl Bromide	74839					48 a	4,000 a
35. Methyl Chloride	74873					n	n
36. Methylene Chloride	75092					4.7 a,c	1,600 a,c
37. 1,1,2,2-Tetrachloroethane	79345					0.17 a,c,s	11 a,c,t
38. Tetrachloroethylene	127184					0.8 c,s	8.85 c,t
39. Toluene	108883					6,800 a	200,000 a
40. 1,2-Trans-Dichloroethylene	156605					700 a	140,000 a
41. 1,1,1-Trichloroethane	71556					n	n
42. 1,1,2-Trichloroethane	79005					0.60 a,c,s	42 a,c,t
43. Trichloroethylene	79016					2.7 c,s	81 c,t
44. Vinyl Chloride	75014					2 c,s	525 c,t
45. 2-Chlorophenol	95578					120 a	400 a
46. 2,4-Dichlorophenol	120832					93 a,s	790 a,t
47. 2,4-Dimethylphenol	105679					540 a	2,300 a
48. 2-Methyl-4,6-Dinitrophenol	534521					13.4 s	765 t
49. 2,4-Dinitrophenol	51285					70 a,s	14,000 a,t
50. 2-Nitrophenol	88755						
51. 4-Nitrophenol	100027						
52. 3-Methyl-4-Chlorophenol	59507						
53. Pentachlorophenol	87865	19 f,w	15 f,w	13	7.9	0.28 a,c	8.2 a,c,j
54. Phenol	108952					21,000 a	4,600,000 a,j,t
55. 2,4,6-Trichlorophenol	88062					2.1 a,c	6.5 a,c
56. Acenaphthene	83329					1,200 a	2,700 a
57. Acenaphthylene	208968						
58. Anthracene	120127					9,600 a	110,000 a

59. Benzidine	92875					0.00012 a,c,s	0.00054 a,c,t
60. Benzo(a)Anthracene	56553					0.0044 a,c	0.049 a,c
61. Benzo(a)Pyrene	50328					0.0044 a,c	0.049 a,c
62. Benzo(b)Fluoranthene	205992					0.0044 a,c	0.049 a,c
63. Benzo(ghi)Perylene	191242						
64. Benzo(k)Fluoranthene	207089					0.0044 a,c	0.049 a,c
65. Bis(2-Chloroethoxy)Methane	111911						
66. Bis(2-Chloroethyl)Ether	111444					0.031 a,c,s	1.4 a,c,t
67. Bis(2-Chloroisopropyl)Ether	39638329					1,400 a	170,000 a,t
68. Bis(2-Ethylhexyl)Phthalate	117817					1.8 a,c,s	5.9 a,c,t
69. 4-Bromophenyl Phenyl Ether	101553						
70. Butylbenzyl Phthalate	85687					3,000 a	5,200 a
71. 2-Chloronaphthalene	91587					1,700 a	4,300 a
72. 4-Chlorophenyl Phenyl Ether	7005723						
73. Chrysene	218019					0.0044 a,c	0.049 a,c
74. Dibenzo(a,h)Anthracene	53703					0.0044 a,c	0.049 a,c
75. 1,2 Dichlorobenzene	95501					2,700 a	17,000 a
76. 1,3 Dichlorobenzene	541731					400	2,600
77. 1,4 Dichlorobenzene	106467					400	2,600
78. 3,3'-Dichlorobenzidine	91941					0.04 a,c,s	0.077 a,c,t
79. Diethyl Phthalate	84662					23,000 a,s	120,000 a,t
80. Dimethyl Phthalate	131113					313,000 s	2,900,000 t
81. Di-n-Butyl Phthalate	84742					2,700 a,s	12,000 a,t
82. 2,4-Dinitrotoluene	121142					0.11 c,s	9.1 c,t
83. 2,6-Dinitrotoluene	606202						
84 Di-n-Octyl Phthalate	117840						
85. 1,2-Diphenylhydrazine	122667					0.040 a,c,s	0.54 a,c,t
86. Fluoranthene	206440					300 a	370 a
87. Fluorene	86737					1,300 a	14,000 a
88. Hexachlorobenzene	118741					0.00075 a,c	0.00077 a,c
89. Hexachlorobutadiene	87683					0.44 a,c,s	50 a,c,t
90. Hexachlorocyclopentadiene	77474					240 a,s	17,000 a,j,t
91. Hexachloroethane	67721					1.9 a,c,s	8.9 a,c,t

92. Indeno(1,2,3-cd) Pyrene	193395					0.0044 a,c	0.049 a,c
93. Isophorone	78591					8.4 c,s	600 c,t
94. Naphthalene	91203						
95. Nitrobenzene	98953					17 a,s	1,900 a,j,t
96. N-Nitrosodimethylamine	62759					0.00069 a,c,s	8.1 a,c,t
97. N-Nitrosodi-n-Propylamine	621647					0.005 a	1.4 a
98. N-Nitrosodiphenylamine	86306					5.0 a,c,s	16 a,c,t
99. Phenanthrene	85018						
100. Pyrene	129000					960 a	11,000 a
101. 1,2,4-Trichlorobenzene	120821						
102. Aldrin	309002	3 g		1.3 g		0.00013 a,c	0.00014 a,c
103. alpha-BHC	319846					0.0039 a,c	0.013 a,c
104. beta-BHC	319857					0.014 a,c	0.046 a,c
105. gamma-BHC	58899	0.95 w		0.16 g		0.019 c	0.063 c
106. delta-BHC	319868						
107. Chlordane	57749	2.4 g	0.0043 g	0.09 g	0.004 g	0.00057 a,c	0.00059 a,c
108. 4,4'-DDT	50293	1.1 g	0.001 g	0.13 g	0.001 g	0.00059 a,c	0.00059 a,c
109. 4,4'-DDE	72559					0.00059 a,c	0.00059 a,c
110. 4,4'-DDD	72548					0.00083 a,c	0.00084 a,c
111. Dieldrin	60571	0.24 w	0.056 w	0.71 g	0.0019 g	0.00014 a,c	0.00014 a,c
112. alpha-Endosulfan	959988	0.22 g	0.056 g	0.034 g	0.0087 g	110 a	240 a
113. beta-Endosulfan	33213659	0.22 g	0.056 g	0.034 g	0.0087 g	110 a	240 a
114. Endosulfan Sulfate	1031078					110 a	240 a
115. Endrin	72208	0.086 w	0.036 w	0.037 g	0.0023 g	0.76 a	0.81 a,j
116. Endrin Aldehyde	7421934					0.76 a	0.81 a,j
117. Heptachlor	76448	0.52 g	0.0038 g	0.053 g	0.0036 g	0.00021 a,c	0.00021 a,c
118. Heptachlor Epoxide	1024573	0.52 g	0.0038 g	0.053 g	0.0036 g	0.00010 a,c	0.00011 a,c
119-125. Polychlorinated biphenyls (PCBs)			0.014 u		0.03 u	0.00017 c,v	0.00017 c,v
126. Toxaphene	8001352	0.73	0.0002	0.21	0.0002	0.00073 a,c	0.00075 a,c
Total Number of Criteria [h]		22	21	22	20	92	90

BILLING CODE 6560–50–C

Footnotes to Table in Parargraph (b)(1):

a. Criteria revised to reflect the Agency q1* or RfD, as contained in the Integrated Risk Information System (IRIS) as of October 1, 1996. The fish tissue bioconcentration factor (BCF) from the 1980 documents was retained in each case.

b. Criteria apply to California waters except for those waters subject to objectives in Tables III–2A and III–2B of the San Francisco Regional Water Quality Control Board's (SFRWQCB) 1986 Basin Plan, that were adopted by the SFRWQCB and the State Water Resources Control Board, approved by EPA, and which continue to apply.

c. Criteria are based on carcinogenicity of 10 (-6) risk.

d. Criteria Maximum Concentration (CMC) equals the highest concentration of a pollutant to which aquatic life can be exposed for a short period of time without deleterious effects. Criteria Continuous Concentration (CCC) equals the highest concentration of a pollutant to which aquatic life can be exposed for an extended period of time (4 days) without deleterious effects. ug/L equals micrograms per liter.

e. Freshwater aquatic life criteria for metals are expressed as a function of total hardness (mg/L) in the water body. The equations are provided in matrix at paragraph (b)(2) of this section. Values displayed above in the matrix correspond to a total hardness of 100 mg/l.

f. Freshwater aquatic life criteria for pentachlorophenol are expressed as a function of pH, and are calculated as follows: Values displayed above in the matrix correspond to a pH of 7.8. CMC = exp(1.005(pH) − 4.869). CCC = exp(1.005(pH) − 5.134).

g. This criterion is based on 304(a) aquatic life criterion issued in 1980, and was issued in one of the following documents: Aldrin/Dieldrin (EPA 440/5–80–019), Chlordane (EPA 440/5–80–027), DDT (EPA 440/5–80–038), Endosulfan (EPA 440/5–80–046), Endrin (EPA 440/5–80–047), Heptachlor (440/5–80–052), Hexachlorocyclohexane (EPA 440/5–80–054), Silver (EPA 440/5–80–071). The Minimum Data Requirements and derivation procedures were different in the 1980 Guidelines than in the 1985 Guidelines. For example, a "CMC" derived using the 1980 Guidelines was derived to be used as an instantaneous maximum. If assessment is to be done using an averaging period, the values given should be divided by 2 to obtain a value that is more comparable to a CMC derived using the 1985 Guidelines.

h. These totals simply sum the criteria in each column. For aquatic life, there are 23 priority toxic pollutants with some type of freshwater or saltwater, acute or chronic criteria. For human health, there are 92 priority toxic pollutants with either "water + organism" or "organism only" criteria. Note that these totals count chromium as one pollutant even though EPA has developed criteria based on two valence states. In the matrix, EPA has assigned numbers 5a and 5b to the criteria for chromium to reflect the fact that the list of 126 priority pollutants includes only a single listing for chromium.

i. Criteria for these metals are expressed as a function of the water-effect ratio, WER, as defined in paragraph (c) of this section. CMC = column B1 or C1 value x WER; CCC = column B2 or C2 value x WER.

j. No criterion for protection of human health from consumption of aquatic organisms (excluding water) was presented in the 1980 criteria document or in the 1986 Quality Criteria for Water. Nevertheless, sufficient information was presented in the 1980 document to allow a calculation of a criterion, even though the results of such a calculation were not shown in the document.

k. The CWA 304(a) criterion for asbestos is the MCL.

l. [Reserved]

m. These freshwater and saltwater criteria for metals are expressed in terms of the dissolved fraction of the metal in the water column. Criterion values were calculated by using EPA's Clean Water Act 304(a) guidance values (described in the total recoverable fraction) and then applying the conversion factors in § 131.36(b)(1) and (2).

n. EPA is not promulgating human health criteria for these contaminants. However, permit authorities should address these contaminants in NPDES permit actions using the State's existing narrative criteria for toxics.

o. These criteria were promulgated for specific waters in California in the National Toxics Rule ("NTR"), at § 131.36. The specific waters to which the NTR criteria apply include: Waters of the State defined as bays or estuaries and waters of the State defined as inland, i.e., all surface waters of the State not ocean waters. These waters specifically include the San Francisco Bay upstream to and including Suisun Bay and the Sacramento-San Joaquin Delta. This section does not apply instead of the NTR for this criterion.

p. A criterion of 20 ug/l was promulgated for specific waters in California in the NTR and was promulgated in the total recoverable form. The specific waters to which the NTR criterion applies include: Waters of the San Francisco Bay upstream to and including Suisun Bay and the Sacramento-San Joaquin Delta; and waters of Salt Slough, Mud Slough (north) and the San Joaquin River, Sack Dam to the mouth of the Merced River. This section does not apply instead of the NTR for this criterion. The State of California adopted and EPA approved a site specific criterion for the San Joaquin River, mouth of Merced to Vernalis; therefore, this section does not apply to these waters.

q. This criterion is expressed in the total recoverable form. This criterion was promulgated for specific waters in California in the NTR and was promulgated in the total recoverable form. The specific waters to which the NTR criterion applies include: Waters of the San Francisco Bay upstream to and including Suisun Bay and the Sacramento-San Joaquin Delta; and waters of Salt Slough, Mud Slough (north) and the San Joaquin River, Sack Dam to Vernalis. This criterion does not apply instead of the NTR for these waters. This criterion applies to additional waters of the United States in the State of California pursuant to 40 CFR 131.38(c). The State of California adopted and EPA approved a site-specific criterion for the Grassland Water District, San Luis National Wildlife Refuge, and the Los Banos State Wildlife Refuge; therefore, this criterion does not apply to these waters.

r. These criteria were promulgated for specific waters in California in the NTR. The specific waters to which the NTR criteria apply include: Waters of the State defined as bays or estuaries including the San Francisco Bay upstream to and including Suisun Bay and the Sacramento-San Joaquin Delta. This section does not apply instead of the NTR for these criteria.

s. These criteria were promulgated for specific waters in California in the NTR. The specific waters to which the NTR criteria apply include: Waters of the Sacramento-San Joaquin Delta and waters of the State defined as inland (*i.e.,* all surface waters of the State not bays or estuaries or ocean) that include a MUN use designation. This section does not apply instead of the NTR for these criteria.

t. These criteria were promulgated for specific waters in California in the NTR. The specific waters to which the NTR criteria apply include: Waters of the State defined as bays and estuaries including San Francisco Bay upstream to and including Suisun Bay and the Sacramento-San Joaquin Delta; and waters of the State defined as inland (i.e., all surface waters of the State not bays or estuaries or ocean) without a MUN use designation. This section does not apply instead of the NTR for these criteria.

u. PCBs are a class of chemicals which include aroclors 1242, 1254, 1221, 1232, 1248, 1260, and 1016, CAS numbers 53469219, 11097691, 11104282, 11141165, 12672296, 11096825, and 12674112, respectively. The aquatic life criteria apply to the sum of this set of seven aroclors.

v. This criterion applies to total PCBs, e.g., the sum of all congener or isomer or homolog or aroclor analyses.

w. This criterion has been recalculated pursuant to the 1995 Updates: Water Quality Criteria Documents for the Protection of Aquatic Life in Ambient Water, Office of Water, EPA–820-B–96–001, September 1996. See also Great Lakes Water Quality Initiative Criteria Documents for the Protection of Aquatic Life in Ambient Water, Office of Water, EPA–80–B–95–004, March 1995.

x. The State of California has adopted and EPA has approved site specific criteria for the Sacramento River (and tributaries) above Hamilton City; therefore, these criteria do not apply to these waters.

General Notes to Table in Paragraph (b)(1)

1. The table in this paragraph (b)(1) lists all of EPA's priority toxic pollutants whether or not criteria guidance are available. Blank spaces indicate the absence of national section 304(a) criteria guidance. Because of variations in chemical nomenclature systems, this listing of toxic pollutants does not duplicate the listing in Appendix A to 40 CFR Part 423–126 Priority Pollutants. EPA has added the Chemical Abstracts Service (CAS) registry numbers, which provide a unique identification for each chemical.

2. The following chemicals have organoleptic-based criteria recommendations that are not included on this chart: zinc, 3-methyl-4-chlorophenol.

3. Freshwater and saltwater aquatic life criteria apply as specified in paragraph (c)(3) of this section.

(2) Factors for Calculating Metals Criteria. Final CMC and CCC values should be rounded to two significant figures.

(i) $CMC = WER \times (Acute\ Conversion\ Factor) \times (\exp\{m_A[\ln(hardness)]+b_A\})$

(ii) $CCC = WER \times (Acute\ Conversion\ Factor) \times (\exp\{m_C[\ln(hardness)]+b_C\})$

(iii) Table 1 to paragraph (b)(2) of this section:

Metal	m_A	b_A	m_C	b_C
Cadmium	1.128	−3.6867	0.7852	−2.715
Copper	0.9422	−1.700	0.8545	−1.702
Chromium (III)	0.8190	3.688	0.8190	1.561
Lead	1.273	−1.460	1.273	−4.705
Nickel	0.8460	2.255	0.8460	0.0584
Silver	1.72	−6.52		
Zinc	0.8473	0.884	0.8473	0.884

Note to Table 1: The term "exp" represents the base e exponential function.

(iv) Table 2 to paragraph (b)(2) of this section:

Metal	Conversion factor (CF) for freshwater acute criteria	CF for freshwater chronic criteria	CF for saltwater acute criteria	CF [a] for saltwater chronic criteria
Antimony	(d)	(d)	(d)	(d)
Arsenic	1.000	1.000	1.000	1.000
Beryllium	(d)	(d)	(d)	(d)
Cadmium	[b] 0.944	[b] 0.909	0.994	0.994
Chromium (III)	0.316	0.860	(d)	(d)
Chromium (VI)	0.982	0.962	0.993	0.993
Copper	0.960	0.960	0.83	0.83
Lead	[b] 0.791	[b] 0.791	0.951	0.951
Mercury				
Nickel	0.998	0.997	0.990	0.990
Selenium		(c)	0.998	0.998
Silver	0.85	(d)	0.85	(d)
Thallium	(d)	(d)	(d)	(d)
Zinc	0.978	0.986	0.946	0.946

Footnotes to Table 2 of Paragraph (b)(2):

[a] Conversion Factors for chronic marine criteria are not currently available. Conversion Factors for acute marine criteria have been used for both acute and chronic marine criteria.

[b] Conversion Factors for these pollutants in freshwater are hardness dependent. CFs are based on a hardness of 100 mg/l as calcium carbonate ($CaCO_3$). Other hardness can be used; CFs should be recalculated using the equations in table 3 to paragraph (b)(2) of this section.

[c] Bioaccumulative compound and inappropriate to adjust to percent dissolved.

[d] EPA has not published an aquatic life criterion value.

Note to Table 2 of Paragraph (b)(2): The term "Conversion Factor" represents the recommended conversion factor for converting a metal criterion expressed as the total recoverable fraction in the water column to a criterion expressed as the dissolved fraction in the water column. See "Office of Water Policy and Technical Guidance on Interpretation and Implementation of Aquatic Life Metals Criteria", October 1, 1993, by Martha G. Prothro, Acting Assistant Administrator for Water available from Water Resource Center, USEPA, Mailcode RC4100, M Street SW, Washington, DC, 20460 and the note to § 131.36(b)(1).

(v) Table 3 to paragraph (b)(2) of this section:

	Acute	Chronic
Cadmium	CF=1.136672—[(ln {hardness}) (0.041838)]	CF = 1.101672—[(ln {hardness})(0.041838)]
Lead	CF=1.46203—[(ln {hardness})(0.145712)]	CF = 1.46203—[(ln {hardness})(0.145712)]

(c) *Applicability.* (1) The criteria in paragraph (b) of this section apply to the State's designated uses cited in paragraph (d) of this section and apply concurrently with any criteria adopted by the State, except when State regulations contain criteria which are more stringent for a particular parameter and use, or except as provided in footnotes p, q, and x to the table in paragraph (b)(1) of this section.

(2) The criteria established in this section are subject to the State's general rules of applicability in the same way and to the same extent as are other Federally-adopted and State-adopted numeric toxics criteria when applied to the same use classifications including mixing zones, and low flow values below which numeric standards can be exceeded in flowing fresh waters.

(i) For all waters with mixing zone regulations or implementation procedures, the criteria apply at the appropriate locations within or at the boundary of the mixing zones; otherwise the criteria apply throughout the water body including at the point of discharge into the water body.

(ii) The State shall not use a low flow value below which numeric standards can be exceeded that is less stringent than the flows in Table 4 to paragraph (c)(2) of this section for streams and rivers.

(iii) Table 4 to paragraph (c)(2) of this section:

Criteria	Design flow
Aquatic Life Acute Criteria (CMC).	1 Q 10 or 1 B 3
Aquatic Life Chronic Criteria (CCC).	7 Q 10 or 4 B 3
Human Health Criteria.	Harmonic Mean Flow

Note to Table 4 of Paragraph (c)(2): 1. CMC (Criteria Maximum Concentration) is the water quality criteria to protect against acute effects in aquatic life and is the highest instream concentration of a priority toxic pollutant consisting of a short-term average not to be exceeded more than once every three years on the average.

2. CCC (Continuous Criteria Concentration) is the water quality criteria to protect against chronic effects in aquatic life and is the highest in stream concentration of a priority toxic pollutant consisting of a 4-day average not to be exceeded more than once every three years on the average.

3. 1 Q 10 is the lowest one day flow with an average recurrence frequency of once in 10 years determined hydrologically.

4. 1 B 3 is biologically based and indicates an allowable exceedence of once every 3 years. It is determined by EPA's computerized method (DFLOW model).

5. 7 Q 10 is the lowest average 7 consecutive day low flow with an average recurrence frequency of once in 10 years determined hydrologically.

6. 4 B 3 is biologically based and indicates an allowable exceedence for 4 consecutive days once every 3 years. It is determined by EPA's computerized method (DFLOW model).

(iv) If the State does not have such a low flow value below which numeric standards do not apply, then the criteria included in paragraph (d) of this section apply at all flows.

(v) If the CMC short-term averaging period, the CCC four-day averaging period, or once in three-year frequency is inappropriate for a criterion or the site to which a criterion applies, the State may apply to EPA for approval of an alternative averaging period, frequency, and related design flow. The State must submit to EPA the bases for any alternative averaging period, frequency, and related design flow. Before approving any change, EPA will publish for public comment, a document proposing the change.

(3) The freshwater and saltwater aquatic life criteria in the matrix in paragraph (b)(1) of this section apply as follows:

(i) For waters in which the salinity is equal to or less than 1 part per thousand 95% or more of the time, the applicable criteria are the freshwater criteria in Column B;

(ii) For waters in which the salinity is equal to or greater than 10 parts per thousand 95% or more of the time, the applicable criteria are the saltwater criteria in Column C except for selenium in the San Francisco Bay estuary where the applicable criteria are the freshwater criteria in Column B (refer to footnotes p and q to the table in paragraph (b)(1) of this section); and

(iii) For waters in which the salinity is between 1 and 10 parts per thousand as defined in paragraphs (c)(3)(i) and (ii) of this section, the applicable criteria are the more stringent of the freshwater or saltwater criteria. However, the Regional Administrator may approve the use of the alternative freshwater or saltwater criteria if scientifically defensible information and data demonstrate that on a site-specific basis the biology of the water body is dominated by freshwater aquatic life and that freshwater criteria are more appropriate; or conversely, the biology of the water body is dominated by saltwater aquatic life and that saltwater criteria are more appropriate. Before approving any change, EPA will publish for public comment a document proposing the change.

(4) *Application of metals criteria.* (i) For purposes of calculating freshwater aquatic life criteria for metals from the equations in paragraph (b)(2) of this section, for waters with a hardness of 400 mg/l or less as calcium carbonate, the actual ambient hardness of the surface water shall be used in those equations. For waters with a hardness of over 400 mg/l as calcium carbonate, a hardness of 400 mg/l as calcium carbonate shall be used with a default Water-Effect Ratio (WER) of 1, or the actual hardness of the ambient surface water shall be used with a WER. The same provisions apply for calculating the metals criteria for the comparisons provided for in paragraph (c)(3)(iii) of this section.

(ii) The hardness values used shall be consistent with the design discharge conditions established in paragraph (c)(2) of this section for design flows and mixing zones.

(iii) The criteria for metals (compounds #1—#13 in the table in paragraph (b)(1) of this section) are expressed as dissolved except where otherwise noted. For purposes of calculating aquatic life criteria for metals from the equations in footnote i to the table in paragraph (b)(1) of this section and the equations in paragraph (b)(2) of this section, the water effect ratio is generally computed as a specific pollutant's acute or chronic toxicity value measured in water from the site covered by the standard, divided by the respective acute or chronic toxicity value in laboratory dilution water. To use a water effect ratio other than the default of 1, the WER must be determined as set forth in Interim Guidance on Determination and Use of Water Effect Ratios, U.S. EPA Office of Water, EPA–823–B–94–001, February 1994, or alternatively, other scientifically defensible methods adopted by the State as part of its water quality standards program and approved by EPA. For calculation of criteria using site-specific values for both the hardness and the water effect ratio, the hardness used in the equations in paragraph (b)(2) of this section must be determined as required in paragraph (c)(4)(ii) of this section. Water hardness must be calculated from the measured calcium and magnesium ions present, and the ratio of calcium to magnesium should be approximately the same in standard laboratory toxicity testing water as in the site water.

(d)(1) Except as specified in paragraph (d)(3) of this section, all waters assigned any aquatic life or human health use classifications in the Water Quality Control Plans for the various Basins of the State ("Basin Plans") adopted by the California State Water Resources Control Board ("SWRCB"), except for ocean waters covered by the Water Quality Control Plan for Ocean Waters of California ("Ocean Plan") adopted by the SWRCB with resolution Number 90–27 on March 22, 1990, are subject to the criteria in paragraph (d)(2) of this section, without exception. These criteria apply to waters identified in the Basin Plans. More particularly, these criteria apply to waters identified in the Basin Plan chapters designating beneficial uses for waters within the region. Although the State has adopted several use designations for each of these waters, for purposes of this action, the specific standards to be applied in paragraph (d)(2) of this section are based on the presence in all waters of some aquatic life designation and the presence or absence of the MUN use designation (municipal and domestic supply). (See Basin Plans for more detailed use definitions.)

(2) The criteria from the table in paragraph (b)(1) of this section apply to the water and use classifications defined in paragraph (d)(1) of this section as follows:

Water and use classification	Applicable criteria
(i) All inland waters of the United States or enclosed bays and estuaries that are waters of the United States that include a MUN use designation.	(A) Columns B1 and B2—all pollutants (B) Columns C1 and C2—all pollutants (C) Column D1—all pollutants
(ii) All inland waters of the United States or enclosed bays and estuaries that are waters of the United States that do not include a MUN use designation.	(A) Columns B1 and B2—all pollutants (B) Columns C1 and C2—all pollutants (C) Column D2—all pollutants

(3) Nothing in this section is intended to apply instead of specific criteria, including specific criteria for the San Francisco Bay estuary, promulgated for California in the National Toxics Rule at § 131.36.

(4) The human health criteria shall be applied at the State-adopted 10 (−6) risk level.

(5) Nothing in this section applies to waters located in Indian Country.

(e) *Schedules of compliance.* (1) It is presumed that new and existing point source dischargers will promptly comply with any new or more restrictive water quality-based effluent limitations ("WQBELs") based on the water quality criteria set forth in this section.

(2) When a permit issued on or after May 18, 2000 to a new discharger contains a WQBEL based on water quality criteria set forth in paragraph (b) of this section, the permittee shall comply with such WQBEL upon the commencement of the discharge. A new discharger is defined as any building, structure, facility, or installation from which there is or may be a "discharge of pollutants" (as defined in 40 CFR 122.2) to the State of California's inland surface waters or enclosed bays and estuaries, the construction of which commences after May 18, 2000.

(3) Where an existing discharger reasonably believes that it will be infeasible to promptly comply with a new or more restrictive WQBEL based on the water quality criteria set forth in this section, the discharger may request approval from the permit issuing authority for a schedule of compliance.

(4) A compliance schedule shall require compliance with WQBELs based on water quality criteria set forth in paragraph (b) of this section as soon as possible, taking into account the dischargers' technical ability to achieve compliance with such WQBEL.

(5) If the schedule of compliance exceeds one year from the date of permit issuance, reissuance or modification, the schedule shall set forth interim requirements and dates for their achievement. The dates of completion between each requirement may not exceed one year. If the time necessary for completion of any requirement is more than one year and is not readily divisible into stages for completion, the permit shall require, at a minimum, specified dates for annual submission of progress reports on the status of interim requirements.

(6) In no event shall the permit issuing authority approve a schedule of compliance for a point source discharge which exceeds five years from the date of permit issuance, reissuance, or modification, whichever is sooner. Where shorter schedules of compliance are prescribed or schedules of compliance are prohibited by law, those provisions shall govern.

(7) If a schedule of compliance exceeds the term of a permit, interim permit limits effective during the permit shall be included in the permit and addressed in the permit's fact sheet or statement of basis. The administrative record for the permit shall reflect final permit limits and final compliance dates. Final compliance dates for final permit limits, which do not occur during the term of the permit, must occur within five years from the date of issuance, reissuance or modification of the permit which initiates the compliance schedule. Where shorter schedules of compliance are prescribed or schedules of compliance are prohibited by law, those provisions shall govern.

(8) The provisions in this paragraph (e), Schedules of compliance, shall expire on May 18, 2005.

[FR Doc. 00–11106 Filed 5–17–00; 8:45 am]

BILLING CODE 6560–50–P

EXHIBIT "14"

CALIFORNIA TOXICS RULE
RESPONSE TO COMMENTS REPORT

VOLUME I

December 1999

Prepared by:

U.S. Environmental Protection Agency
Office of Science and Technology
401 M Street, S.W.
Washington, D.C. 20460

and

U.S. Environmental Protection Agency
Region 9
75 Hawthorne Street
San Francisco, California 94105

TABLE OF CONTENTS

VOLUME I

Index of Comments Sorted by Subject Matter Code v
Index of Comments Sorted by Comment ID number xxi

Subject Matter Codes

A Anti-degradation
B Comment Period
C-01 Mercury
C-02b Copper Aquatic Life
C-03b Nickel Aquatic Life
C-04b Selenium Aquatic Life
C-05b Lead Aquatic Life
C-06b Chromium Aquatic Life
C-07b Cyanide Aquatic Life
C-08a Arsenic Human Health
C-09a Dioxin Human Health
C-10b PCBs Aquatic Life
C-11b PAHs Aquatic Life
C-12a THMs Human Health
C-13 Risk Level
C-14 Fish or Water Consumption
C-15 Salinity
C-16 SDWA
C-17 Methodologies
C-17a Methodologies Human Health
C-17b Methodologies Aquatic Life
C-17c Meth.New Human Health Meth.
C-18 Conversion Factors
C-19 FDA Action Levels
C-20 Scope Prty Toxic Poll. List
C-21 Legal Concerns
C-22 Dissolved versus Total Recoverable
C-23 Sediments/Dredged Materials
C-24 Site-Specific Criteria
C-24a SSC Water Effect Ratios
C-24b SSC Recalculation Procedure
C-24c SSC Santa Ana River
C-24d SSC Effluent Dependent Water
C-24e SSC Designated/Beneficial Uses
C-25 Hardness
C-26 Averaging periods & Exceedence Freq
C-27 Additive/Synergistic Effects
C-28 Detection Limits
C-29 Bioaccumulation
C-30 Narrative Criteria
D Preamble Editorial Comments
E-01 Cost Analysis
E-01a Baselines
E-01a02 Cost Diff. for Effluent Limit
E-01a03 Model 1 Weaknesses

E-01b Cost Triggers
E-01b01 Regulatory Relief Above Threshold
E-01c Executive Order 12866
E-01c01 $100M Threshold
E-01c02 Benefits do not Balance Cost
E-01d Direct Dischargers
E-01d01 Cost Estimate by Commenter
E-01e Indirect Dischargers
E-01e01 Sunnyvale/San Jose
E-01e02 No Costs for Non-SIUs
E-01e03 No Savings from Poll. Red

VOLUME II

Subject Matter Codes
E-01g Sample Facilities
E-01g01 Low or Zero Dilution
E-01g02 Another EA for Sample Facilities
E-01g03 Cost Effectiveness Ratio
E-01g04 AMLs vs. MDLs
E-01g05 Effluent Data
E-01g06 Reasonable Potential
E-01g08 Discharger Representation
E-01g09 Affected Facilities
E-01g10 Toxic Pound Equivalents
E-01h Treatment Assumptions
E-01h01 25% Reduction Assumption
E-01h02 Unit Cost Assumptions
E-01i Alternative Cost Analysis
E-01j
E-01l UMRA - Economic Comments
E-01m Regulatory Relief
E-01m02 Success in Regulatory Relief
E-01m03 Cost of Water Effect Ratios
E-01n Detection Limits
E-01n01 Non-Detects, No Cost
E-01o Background Levels
E-01p Risk Level Costs
E-01q Source Reduction
E-01q01 25% Assumption
E-01q03 Unit Cost Assumption
E-01r Economic Variances
E-01s Secondary, Indirect Cost Impact
E-01u Economic Considerations Task Force
E-01v Discharge Over Time
E-01w Cost per Facility
E-01y Cost of Efforts to Date
E-02 Benefits Analysis
E-02c Overstated Benefits
E-02d Passive Use Value
E-02e Include Omitted Benefits
E-02f Use More Recent Data
E-02g Benefits & Pollution Reduction
E-02h Un-Enclose, Enclose Bay Data
E-02i Impaired Waters Assumptions

E-02k Long-Term Contamination
E-02l Marginal Impacts/Benefits
E-02m Few Pollutant Mask Analysis
E-02o Analysis from Wisconsin
E-02o01 No Peer Review Reference
E-02q Benefits to Public at Large
F Endangered Species Act
G-01 Reasonable Potential
G-02 Compliance Schedules
G-03 Design/Minimum Flows
G-04 Interim Limits
G-05 Mixing Zones & Dilution Credit
G-06 NWQI
G-07 Variances
G-08 State Policy
G-09 Translators
G-10 Pretreatment
G-11 Intake Credits
H Paperwork Reduction Act
I Stormwater/Wet Weather Flows
I-01 Application Sec 301 vs. MEP
I-02 Elliott Memorandum
I-02a Applying WQBELs, Stormwater
I-03 Applicability of Criteria
I-04 Site-Specific Criteria
I-05 Compliance Schedules
I-07 Attainability of Criteria
I-08 SWRCB Flexibility&Authority
I-09 Pesticides in Runoff
I-10 CSO Policy
J Storm Water Economics
J-01 MS4s/CSOs/Industries Costs
J-02 RFA - Small Entity Cost
J-04 End-of-Pipe Treatment versus BMP
J-05 BMPs Inability to Comply
J-06 NEPA
K Water Shed Approach
K-01 TMDLs
K-02 Watershed Permitting
K-03 Watershed/Effluent Trading
L Anti-Backsliding
M Re-Open Comment Period
O Offer of Assistance/Review
P Whole Effluent Toxicity
Q Nonpoint Sources
R RFA/SBREFA
S UMRA
T State Implementation Policy
V Collaborative Approach

Attachments? N
CROSS REFERENCES

Comment: MR. LEE: My name is Fred Lee, L-E-E.

I want to focus on one aspect of the discussions today, and that is the urban stormwater and highway stormwater runoff issues. These are of concern to me. I'm particularly concerned about this issue in applying these criteria to regulating stormwater runoff and the ultimate goal mandated by the Clean Water Act.

I have been involved in criteria and standards development since the 60s, I helped EPA develop its current approach as a peer reviewer for agencies for the so-called gold book criteria, which is still basically the approach being used today to promulgate these criteria.

There is no question, if you understand how the current criteria were developed, that they tend to significantly over regulate urban stormwater runoff. This will result in massive expenditures as we approach the goal of achieving water quality standards in stormwaters.

This is a well-known problem. Everyone knows this is a problem, but everybody says, "Well, apply BMPs for a while." And that's no man's land. what's that really mean and what's MEP mean and so forth?

When I looked at that rule, I said we really missed the boat by not discussing what it's going to cost to apply these criteria to urban stormwater as an ultimate goal where you have no measure for exceedence for five years. That's Clean Water Act requirements.

We've got to get these figures on the table and we've got to start to understand where we're heading for as a goal with respect to applying these criteria as ultimate goals for urban stormwater.

It's -- there may be situations it's 1 to 2 dollars per person per day in the regulated communities. That's the kind of cost we're talking about for achieving Clean Water Act requirements, with no more than one exceedence for constituents, as we've heard, such as copper and lead, zinc, et cetera -- 1 to 2 dollars per person.

We don't have lands to store this water in order to provide treatment, so it's -- to me, it's a matter for EPA as part of this rule to do a proper economic analysis of what it's going to cost the public actually to process ever-increasing BMPs until we get to the goal.

It's a serious mistake. We're talking about a massive bill for this country. And what are we going to get? We'll get a lot of over regulation because criteria are not applicable to this kind of situation.

We need different kind of criteria, and this has been well discussed; we understand that needs to be done obviously.

Response to: CTRH-001-061

EPA disagrees with the comments. See response to CTR-001-003. For a discussion of the scientific validity of CTR criteria, see response to CTR-031-004c. For a discussion of the relationship between criteria, standards, effluent limitations and implementation costs, see response to CTRH-002-006a. For a discussion of EPA's evaluation of studies concerning costs associated with achieving water quality

criteria for storm water discharges, see responses to CTR-013-003 and CTR-040-004.

Comment ID: CTRH-002-024
Comment Author: Gary Hildebrand
Document Type: Public Hearing
State of Origin: CA
Represented Org: L.A. Dept of Public Works
Document Date: 09/19/97
Subject Matter Code: I-03 Applicability of Criteria
References:
Attachments? N
CROSS REFERENCES

Comment: My name is Gary Hildebrand. I'm with the Los Angeles County Department of Public Works, and I'm the stormwater permit program manager for Los Angeles County. I'm here representing the principal permittee for the L.A. County Municipal Stormwater Permit Program which is the largest municipal stormwater permit program in the nation. We have over 86 permittee cities in our program. We cover over a 3,000-square-mile watershed which contains like 9 million people. We also have a 3,000-mile-plus urban storm drain network that permittees must maintain.

First, I'd like to express our support and agreement with the comments expressed at the public hearing yesterday in San Francisco by Mr. Bob Hale, the chairman of the California Stormwater Quality Task Force, and also the other municipal stormwater program representatives, both there and at the hearing today.

Then I would like to provide some additional comments that are concerned to our municipal stormwater program. First off, compliance with the proposed criteria for stormwater discharges may be impractical. The proposed criteria was established for typical steady flow point source discharges and are not applicable to the wet weather flows. Quantity of stormwater discharges, slow conditions and receding waters, the numerous discharge points and the variability in discharge quality, there is no published scientific approach to determine the compliance with water quality criteria for stormwater runoff from a municipal storm drain system. Until such an approach is accepted and published by a regulatory agency, it should not be applicable to municipal stormwater discharges.

Response to: CTRH-002-024

EPA disagrees with the comments. See response to CTR-001-003. For a discussion of the scientific validity of CTR criteria, see response to CTR-031-004c. For a discussion of the relationship between criteria, standards, effluent limitations and implementation costs, see response to CTRH-002-006a. For a discussion of EPA's evaluation of studies concerning costs associated with achieving water quality criteria for storm water discharges, see responses to CTR-013-003 and CTR-040-004.

Subject Matter Code: J Storm Water Economics

Comment ID: CTR-001-007
Comment Author: Law Offices of Alan C. Waltner
Document Type: Storm Water Auth.
State of Origin: CA
Represented Org: Almeda Cnty Clean Wtr Pgm
Document Date: 09/22/97
Subject Matter Code: J Storm Water Economics
References:
Attachments? N
CROSS REFERENCES

Comment: SIGNIFICANT ECONOMIC IMPACTS WOULD RESULT FROM THE APPLICATION OF WATER QUALITY STANDARDS AS NUMERIC EFFLUENT LIMITATIONS OR WASTELOAD ALLOCATIONS

If EPA intends that the WQS have a more direct effect on the permitting for MS4s, the implications are significant. in particular, the economic analysis supporting the proposed CTR would be dramatically incomplete. Massive expenditures would be required if storm water systems essentially were required to meet the same numerically based treatment standards as being considered for POTWs. The expenditures that would result from such an approach are being addressed in more detail in other MS4 comments, and will not be repeated here.

However, we note that the economic impact analysis that EPA prepared to support the proposed rule assumes that the regulation would have no economic impact on MS4s. (*11) If MS4s are subjected to NELs or WLAs as a result of the rule, significant economic impacts would result. Even if water quality based effluent limitations are based on BMPS, they would have an economic impact if they represent controls more extensive than the maximum extent practicable criteria of Section 402(p). EPA's economic analysis also provides no basis for estimating the costs to MS4s, since the "representative" dischargers analyzed in the economic analysis do not include any storm water systems. The economic analysis does not include these costs and it would be arbitrary to adopt a rule that would have these implications without considering those costs. (*12)

(*11) Likewise, the economic analysis supporting the State Implementation Policy excluded consideration of the costs to municipal storm water systems, on the theory that "the proposed Policy does not impose new regulatory requirements and, therefore, no additional costs are anticipated (i.e., . . . storm water . . .)" SIP at VIII-33. Elsewhere the SIP urges that: "The SWRCB is making no changes in the existing storm water program at the SWRCB and RWQCB. For these reasons, this cost analysis did not consider the storm water proposed Policy issue." Id. at VIII-43. These municipal costs were excluded even though the benefits calculations assumed that the proposed water quality standards would be achieved and that, with respect to San Francisco Bay, the share of toxic loadings attributable to nonpoint sources is estimated to range from 90% to 99% of the total. SIP at VIII-25. It is fundamental that "you can't get something for nothing" and the conflicting assumptions in the SIP, which parallel assumptions in the economic analysis of the CTR, are simply arbitrary.

(*12) Also, since EPA stands in the shoes of the state in adopting these criteria the action would violate the cost balancing elements of the Porter Cologne Act, as discussed below. At minimum, to the extent

that the rule creates an inflexible obligation to implement the criteria with respect to MS4s without complying with Porter Cologne Act requirements, it would set the State and Regional Boards on a collision course with those requirements at the Basin Plan and NPDES permitting phases.

Response to: CTR-001-007

EPA did not ascribe benefits or costs of controlling storm water discharges in the proposed or final Economic Analysis. EPA believes that many storm water dischargers can avoid violation of water quality standards through application of best management practices that are already required by current storm water permits. This conclusion is supported by EPA's analysis of the data submitted by several commenters (see response to CTR-040-004). EPA articulated its position on the use of BMPs in storm water permits in the Interim Permitting Approach for Water Quality Based Effluent Limitations in Storm Water Permits (61 FR 43761, August 19, 1996).

The commenter claims that even with the application of current BMPs, its storm water dischargers would still violate water quality standards due to the CTR criteria. The commenter appears to assume that the storm water discharge would be subject to numeric water quality based effluent limits which would be equivalent to the criteria values and applied as effluent limits never to be exceeded, or calculated in the same manner that effluent limits are calculated for other point sources, such as POTWs. The commenter then appears to assume that such WQBELs would then require the construction of very costly end-of-pipe controls.

EPA contends that neither scenario is valid with regards to developing WQBELs for storm water discharges or establishing compliance with WQBELs. EPA acknowledges that wet weather discharges are technically difficult to model and evaluate financially, because they are intermittent and highly variable. Wet weather discharges also occur under more diverse hydrologic or climatic conditions than continuous discharges from industrial or municipal facilities, which are evaluated under critical low flow or drought conditions. If the EPA had enough data to completely characterize all the conditions and do the necessary modelling, WQBELs would be developed using dynamic models to account for the intermittent loadings and exposures from the storm water discharges. In the absence of this data, EPA will continue to advocate the use of BMPs, as discussed in the CTR preamble. Therefore, EPA believes there is inadequate information at the current time to conclude whether the CTR will have any cost impact on storm water dischargers. Until that information is available, it is premature to project that storm water dischargers would be subject to strict numeric WQBELs and would incur any costs beyond those for which they are already legally responsible under the Clean Water Act. EPA will continue to work with the State to implement storm water permits that comply with water quality standards with an emphasis on pollution prevention and best management practices rather than costly end-of-pipe controls.

See also response to CTR-040-004.

EPA disagrees that the CTR must meet the requirements of the Porter Cologne Act. As a Federal agency, EPA is not subject to the requirements of the Porter-Cologne Act, which is State law. See also response to CTR-020-002 (Category C-21; Legal Issues).

Comment ID: CTR-013-003
Comment Author: County of Los Angeles
Document Type: Storm Water Auth.
State of Origin: CA

In its analysis, the USEPA appears to assume that a BMP program will lead to compliance and that there is no associated cost for a BMP Program (over and above what an MS4 has in place already). Studies conducted by the County of Sacramento and Fresno Metropolitan Flood Control district shows this to be incorrect, i.e., a BMP program cannot comply with the proposed criteria. Furthermore, these studies show that the cost for a BMP program is significant and would increase substantially if an MS4 was required to construct end-of-pipe treatment for compliance. The USEPA should not implement the proposed criteria to MS4 discharges until such time as an adequate economic analysis addressing the true impacts to MS4 dischargers is conducted and assessed.

Response to: CTR-014-003

See response to CTR-013-003.

Comment ID: CTR-014-004b
Comment Author: City of Lakewood
Document Type: Local Government
State of Origin: CA
Represented Org:
Document Date: 09/25/97
Subject Matter Code: J Storm Water Economics
References: Letter CTR-014 incorporates by reference letters CTR-013 and CTR-027

Attachments? N
CROSS REFERENCES R

Comment: 4. The proposed rule applies to all current and future MS4 dischargers, including small communities. These small communities will be significantly impacted by the proposed rule. In California, there are many small communities that are currently co-permittees to MS4 permits. Many of the larger municipalities in California have conducted stormwater discharge characterization studies. These studies have shown that there are common pollutants associated with stormwater discharges from urbanized areas that could result in compliance problems with the proposed criteria. Most small communities have not conducted discharge characterization studies; however, it is reasonable to assume that discharges from small communities would also contain these same pollutants. This would result in a smaller community being faced with the same compliance issues as large and medium municipalities; however, the cost to comply could be more significant and prohibitive for smaller communities.

The Regulatory Flexibility Act requires the USEPA to conduct an analysis on the economic impact the proposed rule may have on small entities, unless the USEPA certifies that the rule will not affect a significant number of small entities. In the preamble to the proposed rule(*1) it indicates that there are no small entities to be impacted by the rule, and, therefore, the USEPA did not need to complete an analysis required under the Act. The USEPA neglected to address small MS4 communities in California that are currently subject to a MS4 permits, and those smaller communities that may be impacted through Phase 11. The USEPA should have conducted an analysis on the economic impacts to smaller communities.

Unless the preamble is modified to indicate that MS4s are not required to comply with water quality standards, the proposed rule should not be applied to smaller MS4 communities until the USEPA has complied with the requirements of the Regulatory Flexibility Act.

EPA used the MDL as the compliance level. Although EPA used the pollutant MDL for costing purposes, the Agency acknowledges that estimating treatment costs for WQBELs below the MDL is speculative and likely unrealistic.

Finally, many of the commenters included costs related to installation of treatment for storm water discharges. As further described in the responses to CTR-021-008, CTR-013-003 and CTR-040-004, EPA believes that the final CTR will not significantly affect the current storm water program being implemented by the State, which includes the requirement to develop best management practices to control pollutants in storm water discharges. As such, EPA believes that inclusion of end-of-pipe treatment costs for storm water are inappropriate.

With respect to EPA's analysis of nonpoint source dischargers see response to CTR-034-014e.

Reference: SAIC. 1995. Assessment of Compliance Costs Resulting from Implementation of the Final Great Lakes Water Quality Guidance. Prepared for U.S. EPA, Office of Science and Technology, March 13.

Comment ID: CTR-036-002a
Comment Author: County of Orange
Document Type: Local Government
State of Origin: CA
Represented Org:
Document Date: 09/25/97
Subject Matter Code: J Storm Water Economics
References: Letter CTR-036 incorporates by reference letters CTR-013, CTR-018, CTR-031, CTR-034 and CTR-040
Attachments? N
CROSS REFERENCES E-01c

Comment: Cost to Implement the Proposed Rule

The inclusion of municipal stormwater discharges under the proposed rule renders the economic analysis invalid, noting municipal studies that show that stormwater discharges cannot comply with all of the proposed criteria with anything short of major national or regional product substitutions, or end-of-pipe treatment:

The Fresno Metropolitan Flood Control District conducted an attainability analysis on stormwater discharges from its urbanized area detention basins. The analysis showed that even with pollutant reductions in the basins, the proposed criteria would not be met.

The Sacramento Stormwater Program conducted an attainability analysis and found that even with an aggressive BMP program the urbanized area would not achieve certain of the water quality criteria, and that the cost of treatment would be on the order of $2 billion.

A preliminary attainability analysis conducted by Orange County, based on a limited dataset, indicates similar findings to Fresno and Sacramento in spite of the implementation of a significant BMP program over a multi-year period (see Attachment 2).

Comment ID: CTR-021-006b
Comment Author: LeBoeuf, Lamb, Green & MacRae
Document Type: Local Government
State of Origin: CA
Represented Org: City of Sunnyvale
Document Date: 09/25/97
Subject Matter Code: E-01c Executive Order 12866
References: Letter CTR-021 incorporates by reference letter CTR-035
Attachments? Y
CROSS REFERENCES J
R
S
I-01

Comment: It is with a sense of reluctance that Sunnyvale joins in CASA/Tri-TAC's adverse comments on the CTR and the EA, and Sunnyvale does so in a spirit of constructive criticism and with an expectation that the Agency will make the necessary adjustments in its approach towards the CTR before the final rule is promulgated. In addition, in the same spirit and with the same expectation, Sunnyvale would like to make the following points on its own behalf:

3. Failure to Address Important Stormwater-Related Issues. In addition to its POTW, Sunnyvale is the owner of a system of storm drains which contribute wet weather flows to the South Bay. We are concerned that the EA entirely neglects the potential impacts of the proposed CTR on the storm drains. The EA entirely omits any meaningful analysis of the costs of bringing storm drains into compliance with the proposed CTR, thereby significantly understating the overall costs of the CTR. We believe that this omission is violative of the Agency's legal obligations under the authorities cited in the preceding paragraph.

In addition, we join in the comments being filed by the various other operators of stormwater collection systems to the effect that EPA has overstated the legal requirements for storm drains to comply with numerical criteria.

Response to: CTR-021-006b

EPA did not include benefits or costs of controlling nonpoint sources or storm water dischargers in its estimates of benefits and costs of the CTR. EPA believes that the final rule will not have a direct effect on sources not permitted under the NPDES program (e.g., nonpoint sources) or NPDES sources not typically subject to numeric water quality-based effluent limits (e.g., wet weather discharges) beyond those already being implemented under current state programs. The CTR language allows (consistent with EPA's policy) the practice of applying maximum extent practicable (MEP) to MS4 permits, along with BMPs as effluent limits to meet water quality standards where infeasible or insufficient information exists to develop water quality-based effluent limits. Any potential indirect effect on nonpoint sources and wet weather discharges, such as runoff from farms, urban areas, and abandoned mines, and contaminated sediment, is unknown at this time. Many of the programs developed to control nonpoint sources and wet weather discharges are already in place in the State of California. Costs due to these programs have already been incurred or will soon be incurred owing to existing federal, State, and local environmental programs. EPA evaluated the comments and analyses submitted by commenters providing costs for controlling nonpoint sources and none of these comments provided a definitive argument that

storm water dischargers cannot achieve compliance with the proposed water quality criteria or that compliance would result in widespread economic impact or hardship.

EPA also acknowledges that nonpoint sources and wet weather discharges are technically difficult to model and evaluate costs because they are intermittent and highly variable. Nonpoint source and wet weather discharges also occur under different hydrologic or climatic conditions than continuous discharges from industrial and municipal facilities, which are evaluated under critical low flow or drought conditions. Thus, evaluating agricultural nonpoint source discharges and storm water discharges and their effects on the environment is highly site-specific and data intensive.

See also response to CTR-040-004.

Comment ID: CTR-031-006c
Comment Author: Fresno Metro. Flood Ctrl Dist.
Document Type: Flood Ctrl. District
State of Origin: CA
Represented Org:
Document Date: 09/25/97
Subject Matter Code: E-01c Executive Order 12866
References: Letter CTR-031 incorporates by reference letter CTR-027
Attachments? N
CROSS REFERENCES J
R

Comment: b. If the CTR as proposed in the current draft is applied to municipal storm water dischargers so as to require numeric effluent limitations in municipal stormwater permits, the cost to the public will be phenomenal. In the economic analysis of the CTR, EPA failed to consider these costs, and failed to consider the costs to industrial storm water dischargers as well.

The District Is urban storm water drainage system captures through retention 90% of its annual average runoff, and discharges 90% after detention (1% is directly discharged without treatment). The system cost in 1997 dollars is estimated at $500 million.

The only option available to the District to mitigate violations of the proposed criteria would be to expand system storage to capture 100% of average annual runoff. Increasing system storage by 20,000 acre feet (estimated additional storage required for average years), at the current cost of $11,000-$20,00 per acre foot of storage, would result in a capital expenditure of $220,000,000 to $400,000,000.

Even with this exorbitant investment, in approximately half of the rain seasons storage would be exceeded, and 100% of the discharges would be expected to exceed the dissolved metals criteria noted above.

Smaller cities (under 50,000) in California are currently subject to NPDES municipal storm water discharge permits, and many more will be included upon implementation of the Stormwater Phase II program. EPA's failure to assess economic impacts on small cities would appear to be contrary to the requirements of the Federal Regulatory Flexibility Act.

The District includes in its constituency industrial businesses. The District serves these businesses and

EPA's interim policy regarding application of the CTR to storm water dischargers is described in response to Comment ID CTR-001-002. The issue raised here is more one of how criteria are implemented for storm water dischargers and not the criteria themselves, which are developed to be protective of aquatic life and human health. In addition, the criteria are biologically based and, as such, if applied with the appropriate duration and frequency for storm water events, reflect a biologically-based approach.

Comment ID: CTR-031-005b
Comment Author: Fresno Metro. Flood Ctrl Dist.
Document Type: Flood Ctrl. District
State of Origin: CA
Represented Org:
Document Date: 09/25/97
Subject Matter Code: I Stormwater/Wet Weather Flows
References: Letter CTR-031 incorporates by reference letter CTR-027
Attachments? N
CROSS REFERENCES G-02

Comment: If the proposed rule is carefully and sufficiently modified to affirm a commitment by EPA to effect only its Congressional authorization as established by CWA section 402(p), then EPA's failure to assess municipal storm water dischargers" ability to attain the proposed standards and associated economic and environmental impacts may be set aside at this time. However, if EPA persists in maintaining the CTR as drafted in this regard, the ambiguities presented in the preamble demand serious consideration and analyses as follows.

a. Many of the criteria are not attainable or scientifically valid with regard to municipal stormwater dischargers, nor is the proposed approach consistent with an appropriate delegation of authority to the State.

iii. State Flexibility and Authority

The CTR states, "The criteria established in this section are subject to the State's general rules of applicability in the same way and to the same extent as are other Federally-adopted and State adopted numeric toxics criteria when applied to the same use classifications..." p. 42206

[INDENT]This language supports State Water Resources Control Board decisions and the San Francisco Basin Plan which have made it clear that municipal storm water dischargers need to address water quality standards only through the implementation, and escalation as necessary, of best management practices. As noted previously, the language of this section must be better supported in the preamble.

Notwithstanding the above statement on page 42206, the CTR actually diminishes state flexibility in implementing the rule and is inconsistent with state compliance schedules. The CTR mandates implementation limits on the state and implies a 5-year limit on compliance.

A five-year compliance schedule for municipal storm water dischargers is entirely inconsistent with the State's, EPA'S, and Phase II stakeholder's understanding of the unique challenges of storm water permitting. The draft Phase II regulation submitted to OMB includes a comprehensive reevaluation of

storm water programs after two permit terms, and recommends no added best management practices or changes in the Phase II program until such evaluation and research are completed.

Response to: CTR-031-005b

See response to CTR-040-004.

EPA believes the CTR is consistent with current State and federal regulatory approaches. Regarding the comment that the CTR is not coordinated with the State Implementation Procedures, the CTR and the State Implementation Plan have been coordinated by EPA and the State in order to be made effective in a similar timeframe. In addition, EPA will review the State Implementation Policy for consistency with the Clean Water Act.

The comment regarding NEPA and ESA review assumes that stormwater discharges subject to numeric effluent limitations will have to be treated by new end-of-pipe facilities. As explained in Comment ID CTR-001-002, EPA believes that implementation of criteria as applied to wet-weather discharges will not require the construction of end-of-pipe facilities.

Comment ID: CTR-036-008
Comment Author: County of Orange
Document Type: Local Government
State of Origin: CA
Represented Org:
Document Date: 09/25/97
Subject Matter Code: I Stormwater/Wet Weather Flows
References: Letter CTR-036 incorporates by reference letters CTR-013, CTR-018, CTR-031, CTR-034 and CTR-040
Attachments? N
CROSS REFERENCES

Comment: We are concerned that the proposed rule precedes actions to evaluate wet weather flows by EPA Headquarters and the establishment of an appropriate scientific approach for stormwater compliance.

Response to: CTR-036-008

EPA's interim policy regarding application of the CTR to storm water dischargers is described in response to Comment ID CTR-001-002. The issue raised here is more one of how criteria are implemented for storm water dischargers and not the criteria themselves, which are developed to be protective of aquatic life and human health. In addition, the criteria are biologically based and, as such, if applied with the appropriate duration and frequency for storm water events, reflect a biologically-based approach.

Comment ID: CTR-036-010b
Comment Author: County of Orange
Document Type: Local Government
State of Origin: CA

References: Letter CTR-031 incorporates by reference letter CTR-027
Attachments? N
CROSS REFERENCES R
E-01c

Comment: b. If the CTR as proposed in the current draft is applied to municipal storm water dischargers so as to require numeric effluent limitations in municipal stormwater permits, the cost to the public will be phenomenal. In the economic analysis of the CTR, EPA failed to consider these costs, and failed to consider the costs to industrial storm water dischargers as well.

The District Is urban storm water drainage system captures through retention 90% of its annual average runoff, and discharges 90% after detention (1% is directly discharged without treatment). The system cost in 1997 dollars is estimated at $500 million.

The only option available to the District to mitigate violations of the proposed criteria would be to expand system storage to capture 100% of average annual runoff. Increasing system storage by 20,000 acre feet (estimated additional storage required for average years), at the current cost of $11,000-$20,00 per acre foot of storage, would result in a capital expenditure of $220,000,000 to $400,000,000.

Even with this exorbitant investment, in approximately half of the rain seasons storage would be exceeded, and 100% of the discharges would be expected to exceed the dissolved metals criteria noted above.

Smaller cities (under 50,000) in California are currently subject to NPDES municipal storm water discharge permits, and many more will be included upon implementation of the Stormwater Phase II program. EPA's failure to assess economic impacts on small cities would appear to be contrary to the requirements of the Federal Regulatory Flexibility Act.

The District includes in its constituency industrial businesses. The District serves these businesses and assists in the oversight of their pollution prevention and storm water permit compliance efforts. Regardless of EPA' s approach to applying the CTR to municipal storm water permits, industrial storm water dischargers are directly and seriously affected by application of the CTR. EPA's failure to assess these economic impacts on our communities is short-sighted and a breach of good public policy.

Response to: CTR-031-006a

With respect to the commenter's estimate of its stormwater costs see response to CTR-040-004. With respect to EPA's compliance with the Regulatory Flexibility Act see response to CTR-013-008b.

Comment ID: CTR-034-014e
Comment Author: SCAP
Document Type: Trade Org./Assoc.
State of Origin: CA
Represented Org:
Document Date: 09/25/97
Subject Matter Code: J Storm Water Economics
References: Letter CTR-034 incorporates by reference letter CTR-035
Attachments? N

CROSS REFERENCES E-01g08
E-01b
E-01e
E-01v

Comment: * In general, we are pleased that EPA prepared an analysis of the economic impacts of the proposed CTR, and that a major portion of EPA's work focused on determining the potential impacts on POTWs. However, we believe that this analysis is based on improper assumptions and inaccurate cost estimates, resulting in unconvincing conclusions. Detailed comments can be found in Attachment 2. A few of the areas of concern are listed below:

* Small facilities appear to be under represented in EPA's sample of POTWS, especially for minor dischargers.

* The cost triggers used as regulatory relief thresholds are unrealistic, and are not consistent with EPA regulations and policies.

* The assumptions used to determine cost estimates for indirect dischargers appear to omit a large proportion of potentially affected industries.

* The Economic Analysis does not take into account projected population and industrial growth over time, which may influence effluent quality and quantity. Statewide, the population is projected to grow by nearly 50% by 2020.

* The use of average cost estimates masks economic impacts on individual dischargers, which may be particularly acute for small communities.

* The economic Analysis ignores the costs that may be incurred by stormwater dischargers and nonpoint sources to reduce loadings so that CTR criteria may be met in ambient waters.

Response to: CTR-034-014e

For analysis of the final CTR, EPA updated its Economic Analysis to reflect the most recent data and information for each sample facility and also increased the sample size for minor facilities. Based on this revised analysis, EPA estimated that minor POTWs will incur costs of approximately $5,000 per facility per year under the low cost scenario and $7,800 per facility per year under the high cost scenario.

EPA acknowledges that evaluating the impact of each individual direct discharger to inland waters, enclosed bays, and estuaries within the State of California would be the most accurate method to determine impacts of the CTR. However, the resources that would be required to perform such an analysis for each of the over 1,241 direct dischargers are beyond the resources typically available for development of environmental regulations. Therefore, in developing the methodology for estimating the compliance costs for the proposed CTR, time and budget constraints limited EPA's costing review to a subset of the regulated community. However, EPA believes that the sample selected adequately represents the various types of direct dischargers in the State.

EPA acknowledges that minor dischargers were sampled less frequently as compared to the major dischargers. However, by definition, under the NPDES permit program, facilities classified as minor would not be expected to discharge toxic pollutants in toxic amounts. Since the CTR addresses only

toxic pollutants, EPA would not expect significant, if any, impact to minor dischargers.

In analyses of the final CTR, EPA increased the sample of minors by five randomly selected facilities to bolster its analysis. EPA estimated costs of $872 per minor facility under the low scenario, and $2,682 per minor facility under the high scenario due to the CTR.

EPA also replaced Silvergate with South Bay in the sample in order to improve the estimate of the impacts of the CTR on the electric utility industry. The draft CTR cost analysis included costs for Silvergate, but the facility had closed and the data available was over five years old. The addition of South Bay, an electric utility facility with no costs, to the sample results in a more realistic, lower overall cost estimate for the electric utility industry.

As described in EA that accompanied the proposed CTR (SAIC and Jones and Stokes Associates, 1997), EPA assumed that regulatory alternatives such as phased total maximum daily loads/water quality assessments, site-specific criteria modifications, standards variances, metals translators, etc., are considered under certain circumstances. Specifically, under the low-end scenario, regulatory alternatives were assumed necessary if the cost for a sample facility exceeded $200 per toxic pounds-equivalent.

EPA assumes that a facility, when faced with the challenge of meeting water quality-based effluent limitations (WQBELs) based on CTR criteria, will select the most cost-effective controls, including regulatory alternatives. In fact, this has been the case in California, where several major POTWs have performed studies in pursuit of regulatory alternatives such as metals translators and site-specific criteria, rather than install costly controls to comply with WQBELs. EPA acknowledges that the actual cost-effectiveness value will vary by facility depending upon many factors, including the characteristics and volume of discharge, the receiving water, etc. However, EPA disagrees that the cost trigger is unrealistic, as it was reasonably based upon the highest reported cost-effectiveness values for industry categories subject to effluent limitations guidelines and standards.

Nonetheless, in the high-end estimate developed for the cost analysis accompanying the final CTR, no cost trigger was used and, thus, EPA's high-end cost estimate did not include the use of a regulatory alternative for any sample facility.

Reference: SAIC and Jones and Stokes Associates, Inc. 1997. Analysis of Potential Costs Related to the Implementation of the California Toxics Rule. Prepared for U.S. EPA, Office of Science and Technology and U.S. EPA Region IX, May 5.

EPA disagrees with the commenter's assertion that the costs for San Jose and Sunnyvale cannot be used to extrapolate costs to indirect users at other POTWs. The procedures for identifying indirect sources contributing specific pollutants to POTWs and developing and implementing a source control plan to minimize these discharges are similar for all types of pollutants. Additionally, similar to San Jose and Sunnyvale, metals were the primary pollutants of concern for POTWs evaluated in the cost analysis. Apart from these studies, EPA has no data upon which to establish facility-level compliance costs for indirect dischargers. To account for this uncertainty, EPA has revised its assumption regarding the percentages of indirect dischargers that may incur these costs. The percentage of facilities that may incur these costs was revised from the initial estimate of from 10% to 30% to a new estimate of from 30% to 70%. EPA believes that these new estimates are highly conservative (i.e. tend to overestimate costs).

Average per facility investment costs for industrial participants were estimated using the mass audit studies for copper and nickel pollution prevention projects with paybacks of less than five years. The average cost per indirect discharger was estimated to be $61,526 or $15,000 per year at an interest rate of

7 percent and over a period of five years. The total annual costs to the indirect discharger population in California then were estimated by multiplying the annualized cost ($15,000) by the total number of potentially affected indirect dischargers.

Under the MAS, the pounds removed by the pollution prevention projects with paybacks of less than five years were 560 pounds per year for copper and 148 pounds per year for nickel. Since neither San Jose nor Sunnyvale required nickel reductions, EPA did not consider pounds removed. Both San Jose and Sunnyvale did require copper reductions under the high-end cost analysis. For San Jose, required reductions equaled approximately 746 non-toxic-weighted pounds per year, however, for Sunnyvale, required reductions equaled 87 pounds per year. Since the industrial facilities to which the MAS results were applied are not as large as the San Jose facility (160 million gallons per day) whose reduction requirements exceed the MAS results, EPA estimated that load reductions from implementing the pollution prevention projects would be adequate.

EPA estimated annual (steady state) benefits and annualized costs. EPA also compared, 20- and 30-years streams of benefits and costs to account for differences in the schedule for experiencing benefits and costs (up-front capital cost and a phase-in of benefits). EPA did not forecast economic, demographic, or policy changes over these time periods. However, EPA does not expect changes in these variables to negatively impact the anticipated ratio of benefits and costs. Instead, EPA believes that increased population and economic activity in the future would likely increase the benefits of achieving standards for toxic pollutants in California waters compared to the cost of controls.

EPA selected sample facilities in order to represent different industry categories, but also various facility sizes with different flow magnitudes. For example, EPA analyzed POTW facilities which fell into three flow categories representing facilities serving very large, medium, and small communities. Costs were averaged for the sample facilities within each flow category for an industry type and then extrapolated to the universe of facilities which matched the industry type and the range in flow for that flow category. Thus, costs calculated for facilities operating in very large communities would not be applied to facilities serving very small communities.

EPA did not include benefits or costs of controlling nonpoint sources or storm water dischargers in its estimates of benefits and costs of the CTR. EPA believes that the final rule will not have a direct effect on sources not permitted under the NPDES program (e.g., nonpoint sources) or NPDES sources not typically subject to numeric water quality-based effluent limits (e.g., wet weather discharges). Any potential indirect effect on nonpoint sources and wet weather discharges, such as runoff from farms, urban areas, and abandoned mines, and contaminated sediment, is either unknown at this time or not a result of this rule. Many of the programs developed to control nonpoint sources and wet weather discharges are already in place. Costs due to these programs have already been incurred or will soon be incurred owing to existing federal, State, and local environmental programs that are distinct from the CTR.

EPA also acknowledges that nonpoint sources and wet weather discharges are technically difficult to model and evaluate costs because they are intermittent and highly variable. Nonpoint source and wet weather discharges also occur under different hydrologic or climatic conditions than continuous discharges from industrial and municipal facilities, which are evaluated under critical low flow or drought conditions. Thus, evaluating agricultural nonpoint source discharges and storm water discharges and their effects on the environment is highly site-specific and data intensive. Until this information is available, it is premature to project that the sources would incur any costs beyond those for which they are already responsible under current regulations of the Clean Water Act.

See also responses to CTR-013-003 and CTR-040-004.

Comment ID: CTR-035-044c
Comment Author: Tri-TAC/CASA
Document Type: Trade Org./Assoc.
State of Origin: CA
Represented Org:
Document Date: 09/25/97
Subject Matter Code: J Storm Water Economics
References:
Attachments? N
CROSS REFERENCES E-01c01
E-01d01

Comment: pp. 42188-42189 - Potential Costs Do Not Meet the $100 Million Threshold Under E 0. 12866 (also see discussion above) As noted on p. 42188, one component of the definition of a "significant regulatory action" is that the rule may have an annual effect on the economy of $100 million or more. EPA states on p.42189 that "the annualized potential costs that direct and indirect dischargers may incur as a result of State implementation of permit limits based on water quality standards using today's proposed criteria are estimated to be between $15 million and $87 million." We believe that this range significantly underestimates the potential costs that may be realized from the implementation of this rule. This belief is based on the numerous assumptions used by EPA that would have served to underestimate potential costs, including assumptions about regulatory flexibility that are clearly contradicted in the Preamble to the rule itself. These issues are further enumerated in Attachment 2, which contains an analysis prepared by the environmental economics firm, M. Cubed. Furthermore, we strongly believe that EPA has a duty to look at a full range of potential costs that may be incurred, and not just to look at the costs under optimistic assumptions. This duty is especially acute in light of the uncertainties of how the CTR will be implemented by the State.

We examined the potential costs for the POTW sector to determine the reasonableness of EPA's cost estimates. Our preliminary analysis indicates that for 23 major POTWs the annualized costs could reach $400 million.(*3) This estimate includes the cost to construct and operate end-of-pipe treatment processes where these would be necessary to achieve projected effluent limits. Unlike the EPA cost estimates, we have assumed that regulatory relief options may not be available, and that, based on the pollutants causing compliance problems, pollution prevention and treatment plant optimization might not be sufficient to reliably achieve compliance. Thus, we feel that this estimate reflects a more accurate depiction of the potential POTW "high-end" compliance costs that could result from the draft CTR. Based on this analysis, we believe that EPA should re-analyze the potential costs for POTWs to meet water quality-based effluent limits based on the criteria in the CTR.

As noted on p. ES-2 of the Economic Analysis (U.S. EPA, 1997a), EPA estimated only the costs to point sources, and did not estimate the potential costs for compliance for nonpoint source dischargers, despite the fact that the majority of water bodies in California are impaired due to nonpoint source discharges (SWRCB, 1996). In addition, EPA failed to estimate the costs of compliance for wet weather dischargers, such as municipal and industrial stormwater dischargers. These omissions also lead us to believe that the potential total costs of the rule are far greater than $100 million. EPA must correct these deficiencies and redo the Economic Analysis.

See also responses to CTR-013-003 and CTR-040-004.

Comment ID: CTR-035-044c
Comment Author: Tri-TAC/CASA
Document Type: Trade Org./Assoc.
State of Origin: CA
Represented Org:
Document Date: 09/25/97
Subject Matter Code: J Storm Water Economics
References:
Attachments? N
CROSS REFERENCES E-01c01
E-01d01

Comment: pp. 42188-42189 - Potential Costs Do Not Meet the $100 Million Threshold Under E 0. 12866 (also see discussion above) As noted on p. 42188, one component of the definition of a "significant regulatory action" is that the rule may have an annual effect on the economy of $100 million or more. EPA states on p.42189 that "the annualized potential costs that direct and indirect dischargers may incur as a result of State implementation of permit limits based on water quality standards using today's proposed criteria are estimated to be between $15 million and $87 million." We believe that this range significantly underestimates the potential costs that may be realized from the implementation of this rule. This belief is based on the numerous assumptions used by EPA that would have served to underestimate potential costs, including assumptions about regulatory flexibility that are clearly contradicted in the Preamble to the rule itself. These issues are further enumerated in Attachment 2, which contains an analysis prepared by the environmental economics firm, M. Cubed. Furthermore, we strongly believe that EPA has a duty to look at a full range of potential costs that may be incurred, and not just to look at the costs under optimistic assumptions. This duty is especially acute in light of the uncertainties of how the CTR will be implemented by the State.

We examined the potential costs for the POTW sector to determine the reasonableness of EPA's cost estimates. Our preliminary analysis indicates that for 23 major POTWs the annualized costs could reach $400 million.(*3) This estimate includes the cost to construct and operate end-of-pipe treatment processes where these would be necessary to achieve projected effluent limits. Unlike the EPA cost estimates, we have assumed that regulatory relief options may not be available, and that, based on the pollutants causing compliance problems, pollution prevention and treatment plant optimization might not be sufficient to reliably achieve compliance. Thus, we feel that this estimate reflects a more accurate depiction of the potential POTW "high-end" compliance costs that could result from the draft CTR. Based on this analysis, we believe that EPA should re-analyze the potential costs for POTWs to meet water quality-based effluent limits based on the criteria in the CTR.

As noted on p. ES-2 of the Economic Analysis (U.S. EPA, 1997a), EPA estimated only the costs to point sources, and did not estimate the potential costs for compliance for nonpoint source dischargers, despite the fact that the majority of water bodies in California are impaired due to nonpoint source discharges (SWRCB, 1996). In addition, EPA failed to estimate the costs of compliance for wet weather dischargers, such as municipal and industrial stormwater dischargers. These omissions also lead us to believe that the potential total costs of the rule are far greater than $100 million. EPA must correct these deficiencies and redo the Economic Analysis.

(*3) Backup information for these cost estimates is available upon request.

Response to: CTR-035-044c

In response to comments received by EPA on the economic analysis that accompanied the proposed CTR, EPA collected additional data for the sample facilities. EPA also revised its estimate of potential compliance costs attributable to the CTR.

EPA's low estimate of total annualized costs of the final CTR is $33.5 million per year and its high estimate is $61.0 million per year. The low and high estimates vary based on whether effluent data or permit limits are used to assess the need for additional controls. They also vary based on whether or not alternative regulatory approaches, such as phased total maximum daily loads/water quality assessments, site-specific criteria modifications, standards variances, metals translators, etc., are considered under certain circumstances. EPA believes that its estimates of costs and benefits are sound.

EPA believes that several general observations can be made regarding studies submitted by commenters and how they differ from the EPA cost study for the final CTR. Many commenters assumed that the mere presence of a pollutant would result in costs to comply with a CTR-based WQBEL. It should be noted that the presence of a pollutant in an ambient inland water, enclosed bay, or estuary does not require permitting authorities to establish a WQBEL for that pollutant. The establishment of a permit limit is appropriate only where the permitting authority determines that a pollutant is likely to be present, and that the pollutant concentration has a "reasonable potential" to cause or contribute to an exceedance of the applicable water quality standard. Where the pollutant is not likely to be present, or is not present at levels that have reasonable potential to cause or contribute to a water quality standard exceedance, a WQBEL may not be necessary.

The majority of cost estimates provided by commenters include the costs for the addition of end-of-pipe treatment to achieve proposed CTR-based WQBELs. This was particularly the case when WQBELs were expected to be below analytical detection levels. EPA disagrees that end-of-pipe treatment is necessary to achieve CTR-based WQBELs in all cases. As discussed in SAIC (1995), there are documented cases where waste minimization or source control techniques have been used to comply with existing permit limits established below detection levels. Other examples include the Western Lake Superior Sanitary District (WLSSD), who after evaluating the costs involved to meet more stringent WQBELs for mercury with end-of-pipe treatment, concluded that pollution prevention techniques were the preferable control strategy. As a result, WLSSD published a guide designed to "assist wastewater treatment plant staff with creating and implementing their own mercury reduction projects." As a result of the efforts of WLSSD, effluent mercury levels were found to decrease from 0.58 parts per billion (ppb) to 0.015 ppb.

Although waste minimization or source controls are not always applicable, EPA assumes in its low estimate of costs that a facility would first evaluate whether process changes or modifications are feasible, prior to incurring costs for adding treatment.

In addition, many commenters assumed that compliance would be based on the WQBEL, regardless of whether it is below the analytical method detection level (MDL). This is not consistent with current practice. Instead, the State may use the "minimum level" (ML) (as defined in 40 CFR Part 136) as the required compliance point where a permit limit is established at a value below the MDL. The ML is a value at which the limited parameter can be accurately quantified, and is always greater than or equal to the MDL. To ensure that its cost estimates were conservative (i.e., erring on the side of higher costs),

EPA used the MDL as the compliance level. Although EPA used the pollutant MDL for costing purposes, the Agency acknowledges that estimating treatment costs for WQBELs below the MDL is speculative and likely unrealistic.

Finally, many of the commenters included costs related to installation of treatment for storm water discharges. As further described in the responses to CTR-021-008, CTR-013-003 and CTR-040-004, EPA believes that the final CTR will not significantly affect the current storm water program being implemented by the State, which includes the requirement to develop best management practices to control pollutants in storm water discharges. As such, EPA believes that inclusion of end-of-pipe treatment costs for storm water are inappropriate.

With respect to EPA's analysis of nonpoint source dischargers see response to CTR-034-014e.

Reference: SAIC. 1995. Assessment of Compliance Costs Resulting from Implementation of the Final Great Lakes Water Quality Guidance. Prepared for U.S. EPA, Office of Science and Technology, March 13.

Comment ID: CTR-036-002a
Comment Author: County of Orange
Document Type: Local Government
State of Origin: CA
Represented Org:
Document Date: 09/25/97
Subject Matter Code: J Storm Water Economics
References: Letter CTR-036 incorporates by reference letters CTR-013, CTR-018, CTR-031, CTR-034 and CTR-040
Attachments? N
CROSS REFERENCES E-01c

Comment: Cost to Implement the Proposed Rule

The inclusion of municipal stormwater discharges under the proposed rule renders the economic analysis invalid, noting municipal studies that show that stormwater discharges cannot comply with all of the proposed criteria with anything short of major national or regional product substitutions, or end-of-pipe treatment:

The Fresno Metropolitan Flood Control District conducted an attainability analysis on stormwater discharges from its urbanized area detention basins. The analysis showed that even with pollutant reductions in the basins, the proposed criteria would not be met.

The Sacramento Stormwater Program conducted an attainability analysis and found that even with an aggressive BMP program the urbanized area would not achieve certain of the water quality criteria, and that the cost of treatment would be on the order of $2 billion.

A preliminary attainability analysis conducted by Orange County, based on a limited dataset, indicates similar findings to Fresno and Sacramento in spite of the implementation of a significant BMP program over a multi-year period (see Attachment 2).

that larger samples of facilities from 0-10 MGD and from 10-100 MGD also would be necessary to obtain valid estimates of POTW costs. In addition, by assuming that existing facilities that contain effluent limits for toxic pollutants were representative facilities and using them as the basis for extrapolation to the universe of potentially affected facilities, EPA may have failed to include a major category of costs. By ignoring the costs of those facilities meeting their current permit limits, EPA is assuming that the facilities they are extrapolating to have similar current permit limits, which was not demonstrated to be the case. Therefore, EPA should reexamine the use of this assumption in the analysis of POTW costs.

Response to: CTR-035-046b

See responses to CTR-059-018 and CTR-040-024.

Comment ID: CTR-035-048
Comment Author: Tri-TAC/CASA
Document Type: Trade Org./Assoc.
State of Origin: CA
Represented Org:
Document Date: 09/25/97
Subject Matter Code: E-01g09 Affected Facilities
References:
Attachments? N
CROSS REFERENCES

Comment: pp. 2-36 - 2-37 (U.S. EPA, 1997b) -- Use of Average Cost Estimates for Extrapolation EPA's use of average costs to estimate individual POTW costs masks a significant range in expenditures, indicating that some communities will be much more significantly impacted than others. By using averages for extrapolation rather than the full range, total cost estimates are likely to be severely underestimated.

Response to: CTR-035-048

EPA selected sample facilities in order to represent different industry categories, but also various facility sizes with different flow magnitudes. For example, EPA analyzed POTW facilities which fell into three flow categories representing facilities serving very large, medium, and small communities. Costs were averaged for the sample facilities within each flow category for an industry type and then extrapolated to the universe of facilities which matched the industry type and the range in flow for that flow category. Thus, costs calculated for facilities operating in very large communities would not be applied to facilities serving very small communities. See also response to CTR-059-018.

This position is contrary to both the letter and the spirit of the RFA. The fact that the toxics criteria contained in the proposed rule must be translated into water quality standards and, in turn, NPDES permit effluent limitations, does not negate the fact that the burden of complying and implementing such toxics criteria ultimately will be borne by individual municipalities and business entities. As noted above, the costs to municipalities alone could run into billion of dollars placing a severe strain on their budgets and forcing them to divert funds currently allocated to other important municipal services, including public safety.

Moreover, EPA's statement that "California will have a number of discretionary choices associated with permit writing" is disingenuous and ironic in light of EPA's rationale for issuing the proposed rule. The toxics criteria will necessarily narrow the State's discretion in issuing NPDES permits and in establishing effluent limits for such permits. If EPA had meant for the State to have any serious discretion, it would not be promulgating these criteria in the first place.

Response to: CTR-036-004a

The purpose of the CTR is to fill the current gaps in water quality criteria in inland surface waters, enclosed bays, and estuaries. EPA disagrees that the State will not have substantial discretion in issuing NPDES permits under the rule. The CTR establishes pollutant levels necessary to protect designated uses. Establishing numeric criteria in the CTR does not limit the discretion of permit writers to use appropriate and flexible tools such as mixing zones or translators for dissolved metals criteria in establishing effluent limits. In addition, if a discharger believes the CTR criterion is inappropriately overprotective of the designated use, the discharger can request the State and EPA to approve a site-specific criterion or to downgrade the designated use.

Comment ID: CTR-040-004
Comment Author: County of Sacramento Water Div
Document Type: Storm Water Auth.
State of Origin: CA
Represented Org:
Document Date: 09/25/97
Subject Matter Code: J Storm Water Economics
References: Letter CTR-040 incorporates by reference letter CTR-027
Attachments? Y
CROSS REFERENCES

Comment: MAJOR CONCERNS

We do, however, have fundamental concerns with the Rule as it is presently proposed and its supporting economic analysis. We believe the Rule can be modified in a manner that will be responsive to our concerns while at the same time being consistent with applicable Federal law and regulations. Our major concerns are presented here and are followed by our recommended modifications.

1. Concern: The Rule, as presently proposed, appears to require discharges from municipal stormwater programs to meet water quality based effluent limits (WQBELs).

* The enclosed attainability analysis (See Attachment A) demonstrates that implementation of an

aggressive BMP-based program will cost on the order of $20 million per year. And, despite the implementation of ever escalating BMPs, the Sacramento Stormwater Management Program will not achieve several of the proposed aquatic life criteria (for copper, lead, and zinc) and human health criteria (for PAHs).

Response to: CTR-040-004

EPA disagrees with the commenter's interpretation of the language regarding wet weather discharges in the proposed CTR, and has clarified the language in the section of the CTR that discusses the applicability of the rule to wet weather discharges. EPA believes that the CTR language allows the practice of applying maximum extent practicable (MEP) to MS4 permits, along with best management practices (BMPs) as effluent limits to meet water quality standards where infeasible or insufficient information exists to develop WQBELs.

Section 402(p)(3)(B) requires municipal separate storm water systems to 1) prohibit non-storm water discharges, and 2) reduce the discharge of pollutants in storm water to MEP. The Agency has purposely not defined MEP to allow municipalities flexibility in designing pollution control measures. MEP is a dynamic performance standard which requires the municipality to demonstrate permit compliance in many ways including the use of BMPs, proper maintenance of their BMPs, and ongoing assessment of BMP performance in reducing pollutant discharges. EPA has determined that, where sufficient information does not exist on which to base WQBELs, or where infeasible, the use of BMPs is consistent with the requirement that municipal storm water programs require controls to reduce the discharge of pollutants to MEP in order to attain and maintain water quality standards.

EPA articulated its position on the use of BMPs in storm water permits in the Interim Permitting Approach For Water Quality-Based Effluent Limitations In Storm Water Permits signed by the Assistant Administrator for Water, Robert Perciasepe on August 1, 1996 (61 FR 43761, August 19, 1996). The policy focuses on the question of the applicability of WQBELs to MS4 permits, and whether or not numeric effluent limitations are required, or could be represented by other control mechanisms such as BMPs. The policy affirms the use of best management practices as a means to attain water quality standards in storm water permits. The policy reads as follows:

In response to recent questions regarding the type of water quality-based effluent limitations that are most appropriate for National Pollutant Discharge Elimination System (NPDES) storm water permits, the Environmental Protection Agency (EPA) is adopting an interim permitting approach for regulating wet weather storm water discharges. Due to the nature of storm water discharges, and the typical lack of information on which to base numeric water quality-based effluent limitations (expressed as concentration and mass), EPA will use an interim permitting approach for NPDES storm water permits.

The interim permitting approach uses best management practices (BMPs) in first-round storm water permits, and expanded or better-tailored BMPs in subsequent permits, where necessary, to provide for the attainment of water quality standards. In cases where adequate information exists to develop more specific conditions or limitations to meet water quality standards, these conditions or limitations are to be incorporated into storm water permits, as necessary and appropriate.

This interim permitting approach is not intended to affect those storm water permits that already include appropriately derived numeric water quality-based effluent limitations. Since the policy only applies to water quality-based effluent limitations, it is not intended to affect technology-based limitations, such as those based on effluent guidelines or the permit writer's best professional judgement, that are incorporated into storm water permits.

Each storm water permit should include a coordinated and cost-effective monitoring program to gather necessary information to determine the extent to which the permit provides for attainment of applicable water quality standards and to determine the appropriate conditions or limitations for subsequent permits. Such a monitoring program may include ambient monitoring, receiving water assessment, discharge monitoring (as needed), or a combination of monitoring procedures designed to gather necessary information.

This interim permitting approach applies only to EPA; however, EPA also encourages authorized States and Tribes to adopt similar policies for storm water permits. This interim permitting approach provides time, where necessary, to more fully assess the range of issues and possible options for the control of storm water discharges for the protection of water quality. This interim permitting approach may be modified as a result of the ongoing Urban Wet Weather Flows Federal Advisory Committee policy dialogue on this subject.

EPA also reviewed the attached report entitled "Technical Report Assessing the Attainability of Water Quality Criteria Proposed in the California Toxics Rule," a report prepared for Sacramento County Stormwater Management Program by Larry Walker Associates (LWA). In response, EPA has the following concerns and comments regarding various aspects of the report and its conclusions.

General Limitations of the Analysis

* LWA do not provide the raw data upon which they base their conclusions regarding potential compliance problems with the proposed CTR water quality criteria. Without the raw data, EPA could not fully assess the validity of the analysis.

* The data may not be representative of the storm water discharges to the American and Sacramento Rivers. Most samples were collected for first-flush events, usually one hour or less in duration. As a result, the in stream exposure period is probably one hour at most, which corresponds to the exposure period for acute criteria, not chronic criteria as used in the LWA analysis.

* LWA report that applying BMPs to storm water would not result in attainment of criteria as proposed in the CTR. However, LWA focus on the most stringent (and unlikely) scenario for attainability of criteria (i.e., applying chronic criteria with no allowance for dilution). According to LWA's own analysis, BMPs would nearly achieve compliance under the scenario of applying acute criteria and dilution factors to storm water flows. If mathematical errors in LWA's Table's 11 and 12 are corrected, the analysis demonstrates compliance with acute criteria for even the 99.91 percentile values of copper, lead, and zinc in the Sacramento River, and for lead in the American River, with no additional treatment.

* The analysis also may not be reflective of the compliance scenario for other California waters. The metals criteria are based on a low hardness value for the American River (25 mg/l as $CaCO_3$). This hardness value is lower than any of the hardness values observed for the economic analysis of sample facilities throughout California. As a result, the criteria for the American River are very stringent (i.e., criteria become more stringent with lower hardness) compared to criteria for California waters in general.

* LWA compare the concentration of the dissolved fraction of metals in the discharge to the instream criterion values expressed as dissolved metals to assess compliance. This approach may be overly stringent because it does not account for the partitioning of dissolved metals present in the discharge to suspended solids present in receiving waters (particularly during a storm event when suspended solids are elevated). Thus, less dissolved metals may be available in the water column than LWA's analysis

would estimate. In addition, this is not the approach that is used to determine compliance under the NPDES program. The NPDES regulations require all permit limits for metals to be expressed in terms of "total recoverable metals" [40 CFR 122.45]. In order to determine whether a discharge would meet NPDES permit limits developed to protect water quality, the instream criteria should not be used directly, but should be converted to a water quality-based effluent limit (WQBEL) using the EPA standards-to-permits procedures. The development of WQBELs expressed as total recoverable metals accounts for the partitioning of dissolved metals (present in the discharge) to suspended solids that are present in the receiving water. EPA used this approach in its cost evaluations.

* Cost estimates provided in the LWA analysis for complying with the CTR appear to mix BMP implementation costs to comply with Sacramento's storm water permit with new compliance costs resulting from the CTR. EPA's economic analysis only evaluates the incremental impact of the water quality standards for toxics compared to the baseline program to avoid a double counting of costs (and benefits).

Specific Data and Sampling Issues

* LWA calculated average event mean concentrations (AEMC) to represent the entire urbanized drainage area of Sacramento County. Samples were combined to calculate AEMCs (based on contributions of 95% commercial/residential and 5% industrial) utilizing three sampling locations. Although LWA indicate that both grab and composite samples were collected to estimate the AEMCs, as well as annual loadings, it is unclear how the different sample types were used. According to the EPA's Guidance Manual For The Preparation of Part 2 of the NPDES Permit Applications for Discharges From Municipal Separate Storm Sewer Systems (EPA 833-B-92-002), an event mean concentration (EMC) is determined from analyses of flow-weighted composite samples. In order to qualify as a valid sample, the storm event must be sampled for at least three hours, or for the entire storm if the event lasts less than three hours. Of great importance in such derivations is consistency in methodology, i.e., the first method employed must always be employed to ensure that results can be compared. LWA do not provide any information to confirm the consistency of sampling procedures.

* LWA completed a discharge characterization project (DCP) for storm water discharges in 1996 (not included as part of commenter's submission). LWA state that the DCP evaluated all urban runoff monitoring data available. However, it is not clear whether the data set used for the DCP was the same as that analyzed for the current report, or whether it was more extensive. LWA state that the DCP used "statistical modeling" (unnamed methodology) to "characterize and estimate" mass loadings. They also state that data on heavy metals, conventional and non-conventional pollutants were "updated for 1996/1997 data. However, they do not report which procedures governed the "update," whether the data sets were consistent, or under what circumstances they were sampled and analyzed. EPA believes that this lack of information makes it impossible to evaluate the methodologies used to extrapolate the data set and draw conclusions as to its appropriateness in demonstrating nonattainability of toxic criteria. In addition, LWA cite a "robust statistical method" for deciding whether to use detection limit values for nondetect data. This method is not described.

* It appears from Charts 1 through 5 presented in the report, that LWA use a limited data set (not included as part of commenter's submission) for each of the pollutants of concern, and use statistical projections to predict "worst case" (i.e., 95th, 99th, and 99.91th percentiles) discharge values. These predicted discharge concentrations are then used to assess whether instream criteria would be met. This is an extremely conservative approach that would not be used by EPA to establish compliance with water quality-based effluent limits or water quality criteria. To assess the potential for metals and organics to exceed aquatic life and human health criteria during intermittent, high flow, storm water episodes, a

complex dynamic modeling effort would be required. This procedure is highly data intensive, and is beyond the scope of this costing analysis; nevertheless, it should have been employed in the LWA analysis to accurately determine the potential for exceedances of criteria. The generalized technical approach for assessing compliance with the applicable criteria is described in EPA's Technical Support Document for Water Quality-Based Toxics Control (March 1991). For typical point sources, this is performed by developing wasteload allocations (using steady-state models, under low flow conditions) and developing WQBELs based on these wasteload allocations. The process of developing wasteload allocations and WQBELs that would be protective of applicable criteria during storm events is significantly more difficult, and is not described in current EPA guidance. The EPA Center for Exposure Assessment Modeling (CEAM), located at the National Exposure Research Laboratory in Athens, Georgia, maintains and distributes environmental simulation models and databases for urban and rural nonpoint sources. Information on dynamic models and their use for storm water modeling can be obtained through CEAM.

Cost Methodology Issues

* It is unclear why Tables 7 and 7a were included in the analysis. These tables appear to present costs associated with the implementation of the BMPs required by the current Sacramento MS4 permit. They are, therefore, distinct from any incremental attainment costs associated with treatment of storm water due to water quality criteria. The potential costs resulting from the alternative of collecting and treating all storm water prior to discharge are summarized in Figure C, however, no details, explanatory notes, or assumptions are presented in support of this estimate.

* Figure B states that capital costs range from $160 to $187 million. However, EPA notes that only the higher value is presented in the summary. The choice to use only the higher value is not explained. It appears that the difference in the values results from the assumed level of engineering and other costs (50% of capital costs, as opposed to 30%, see Table 7). Other published sources have traditionally used a percentage more consistent with the lower of the two values referenced in Table 7 (see, for example, Estimating Costs for the Economic Benefits of RCRA Noncompliance, U.S. EPA, March 1997, page 1-4, where the percentage increase due to engineering and inspection, contractor's overhead and profit, and contingency is 35%).

Other Methodological Issues

* LWA do not clearly state what proportion of the County's runoff enters the American River versus the Sacramento River. LWA base their presentation largely on discharges to the American River which has a two-fold lower hardness concentration, resulting in the most stringent metals criteria. As noted above, a hardness value of 25 mg/l (as $CaCO_3$) is on the very low end of the range for receiving waters considered in the CTR analysis.

* LWA focus their presentation on the "no dilution" scenario. However, both the American and Sacramento Rivers provide substantial dilution (reducing runoff concentrations by 51% and 86%, respectively). The analysis developed in the LWA report summarizes the results of this evaluation in Tables 11 and 12. In presenting the data, the LWA evaluation incorrectly calculates the dilution provided by the Sacramento River. When correctly calculated, the analysis indicates that the acute criteria for all of the metals would be met at the 99.91 percentile value in the Sacramento River. In addition the acute criterion for lead would be met for the American Rivers. Furthermore, compliance with copper and zinc criteria would practically be achieved assuming dilution and implementation of BMPs (i.e., 70% reduction of copper and zinc by BMPs). In their assessment of instream mixing, the LWA analysis used ambient background pollutant concentrations presented in Tables 11 and 12. While

all other values are indicated as "dissolved" concentrations, no such note is provided for the background data. If these values are expressed as total metals it would overestimate the background load and thus underestimate the available assimilative capacity of the stream.

* Similarly, the LWA does not account for in-stream dilution in its evaluation of the potential for PAH compounds and pentachlorophenol to exceed human health criteria. In its evaluation, LWA again projects worst case (i.e., 95th, 99th, and 99.91th percentile) storm water concentration values and compares these values directly to ambient human health criteria. This approach significantly overestimates the potential for exceeding these criteria. Human health criteria are developed assuming a lifetime exposure to the pollutant at a daily ingestion rate of 2 liters of drinking water and ingestion of an assumed mass of aquatic organisms. To account for such long term exposures, EPA permitting procedures recommend using typical stream flows (e.g., harmonic mean) in developing wasteload allocations. The calculated wasteload allocations are also assumed to represent long-term averages (i.e., average monthly permit limits) rather than maximum daily values. Depending on the available dilution, this approach generally results in WQBELs much higher (i.e., less stringent) than the actual criterion values. Based on LWA projections, it appears that even a small allowance for dilution would resolve the compliance concerns or pentachlorophenol. The potential for compliance concerns identified by LWA for PAH compounds could only be accurately determined based on the results of the dynamic modeling assessment previously discussed.

* In calculating the allowable discharge concentration (Ce) for lead and zinc, LWA used detection level values for ambient background concentrations even though no lead or zinc were measured. Since background concentrations may actually be significantly lower than the detection level, this may result in an overly stringent Ce (and thus more costly to achieve).

Comments from the Fresno Metropolitan Flood Control District (Fresno) and the California Department of Transportation (Caltrans)

EPA also reviewed comments submitted by the Fresno Metropolitan Flood Control District (Fresno) and the California Department of Transportation (Caltrans) on the CTR provisions relating to storm water. In response, EPA has the following concerns and comments regarding various aspects of the submissions and their conclusions. Some of these issues are addressed in the above review of LWA's submission and are so referenced.

General Limitations of the Analysis

* Neither Fresno nor Caltrans provide the raw data upon which they base their conclusions regarding potential compliance problems with the proposed CTR water quality criteria. Without the raw data, EPA could not fully assess the validity of the analysis.

* Caltrans' data came from eight storm events at three urban freeway sites in the Los Angeles area, but the sampling methodology is not specified (i.e., first flush, peak, outfall, street, etc.). The data may not be representative of the storm water discharges for all Caltrans facilities. Fresno does not specify the sampling methodology nor the number of sites or storm events sampled.

* Fresno reports that applying BMPs (including end-of-pipe) to storm water would not result in attainment of criteria as proposed in the CTR. However, Fresno presents a stringent (and unlikely) scenario for attainability of criteria (i.e., applying chronic criteria).

* Caltrans reports that applying source reduction and nonstructural BMPs will not provide the reduction

necessary to meet the criteria. End-of-pipe treatment would be required. Although acute criteria are used in this analysis, no data or estimates are provided to demonstrate that BMPs would not result in reductions needed to comply with properly developed WQBELs.

* The analysis also may not be reflective of the compliance scenario for other California waters.

* Fresno and Caltrans compare the concentration of the dissolved fraction of metals in the discharge to the instream criterion values expressed as dissolved metals to assess compliance. See the response to LWA for EPA's discussion of the problems with this approach.

* Cost estimates provided in the Fresno and Caltrans analysis for complying with the CTR may mix BMP implementation costs to comply with local storm water permits with new compliance costs resulting from the CTR. EPA's economic analysis only evaluates the incremental impact of the water quality standards for toxics compared to the baseline program to avoid a double counting of costs (and benefits).

Specific Data and Sampling Issues

* Caltrans specifies that consistent procedures were used at all three sampling sites, but it does not specify the exact methodology (i.e., sampling duration, first flush, etc.). Of great importance in data analysis is consistency in methodology, i.e., the first method employed must always be employed to ensure that results can be compared.

Fresno does not describe its sampling procedures or methodology.

* Caltrans uses a limited data set (not included as part of commenter's submission) for each of the pollutants of concern, and uses statistical projections to predict "worst case" (i.e., 99.91th percentile) discharge values. These predicted discharge concentrations are then used to assess whether in stream criteria would be met. This is an extremely conservative approach that would not be used to establish compliance with water quality-based effluent limits or water quality criteria because compliance is based on measured values and not on statistically derived worst case values.

Summary and Recommendations

The LWA report was based on storm water data collected at outfalls discharging to the American and Sacramento Rivers. The report did not provide the raw data, nor did it provide detailed information on how these data were collected. The primary scenario described in the report (i.e., comparing projected worse case discharge concentrations directly to chronic aquatic life and human health criteria with no allowance for dilution) is highly conservative in comparison with the water quality-based permitting and compliance procedures that would be implemented by EPA. The LWA analysis also did not consider the equilibrium partitioning of dissolved and total metals that may occur instream during a storm event. An ancillary analysis summarized in the LWA report compared the maximum projected discharge concentrations (99.91 percentile values) of copper, lead, and zinc to the acute aquatic life criteria accounting for dilution. If errors are corrected in the LWA spreadsheet, the LWA data indicate that there would be no compliance problems for these parameters in the Sacramento River, and that BMPs would likely result in compliance in the American River. While the LWA analysis provides information that could be useful in determining "reasonable potential" for possible WQBEL development, the approach is not consistent with water quality-based permitting procedures or EPA's approach to compliance assessment.

To accurately determine whether additional treatment would be necessary to control storm water discharges to the American and Sacramento Rivers, EPA would conduct a comprehensive modeling effort to develop appropriate WQBELs. The WQBELs (for organics and total metals), would be developed using dynamic models to account for the intermittent loadings and exposures from the storm water discharges. EPA recognizes that the determination of appropriate WQBELs for storm water outfalls is a difficult modeling effort that requires intensive data collection and verification. The LWA report has not utilized this approach, and the necessary level of effort is not within the scope of the agency's CTR analysis.

In summary, the CTR language allows (consistent with EPA's policy) the practice of applying MEP to MS4 permits, along with BMPs as effluent limits to meet water quality standards where infeasible or insufficient information exists to develop WQBELs. Neither the LWA report, nor the Fresno and Caltrans comments, provide a definitive argument that storm water dischargers cannot achieve compliance with the proposed water quality criteria or that compliance would result in widespread economic impact or hardship. Although none of the three comment submissions discussed above provide the raw data used for their analyses for EPA to fully assess the validity of the analyses, their methodology does not assess compliance with WQBELs as would be developed by EPA. In particular, the assessments do not account for dilution or the partitioning of dissolved metals to suspended solids present in the receiving waters. LWA and Caltrans also do not apply the appropriate criteria in assessing compliance and use statistical projections to predict "worst case" discharge concentrations, an approach that would not be used to establish compliance with WQBELs or water quality criteria. In addition, LWA's estimated costs do not accurately portray the incremental expense to Sacramento County resulting from implementation of the CTR, that is, the costs attributable to the CTR criteria that are over and above the cost of implementing the current storm water program.

Comment ID: CTR-040-006
Comment Author: County of Sacramento Water Div
Document Type: Storm Water Auth.
State of Origin: CA
Represented Org:
Document Date: 09/25/97
Subject Matter Code: J Storm Water Economics
References: Letter CTR-040 incorporates by reference letter CTR-027
Attachments? Y
CROSS REFERENCES

Comment: MAJOR CONCERNS

We do, however, have fundamental concerns with the Rule as it is presently proposed and its supporting economic analysis. We believe the Rule can be modified in a manner that will be responsive to our concerns while at the same time being consistent with applicable Federal law and regulations. Our major concerns are presented here and are followed by our recommended modifications.

1. Concern: The Rule, as presently proposed, appears to require discharges from municipal stormwater programs to meet water quality based effluent limits (WQBELs).

* In order to achieve WQBELS, it will be necessary to intercept all of the urban runoff from the Sacramento metropolitan area (including that discharged to urban streams and the American River),

due to these programs have already been incurred or will soon be incurred owing to existing federal, State, and local environmental programs.

EPA also acknowledges that nonpoint sources and wet weather discharges are technically difficult to model and evaluate costs because they are intermittent and highly variable. Nonpoint source and wet weather discharges also occur under different hydrologic or climatic conditions than continuous discharges from industrial and municipal facilities, which are evaluated under critical low flow or drought conditions. Thus, evaluating agricultural nonpoint source discharges and storm water discharges and their effects on the environment is highly site-specific and data intensive.

See also response to CTR-040-004.

Comment ID: CTRH-001-001b
Comment Author: Robert Hale
Document Type: Public Hearing
State of Origin: CA
Represented Org: CA Stormwater Task Force
Document Date: 09/17/97
Subject Matter Code: J Storm Water Economics
References:
Attachments? N
CROSS REFERENCES I-1

Comment: MR. HALE: Good afternoon. My name is Robert Hale and I'm the chairman of the California Stormwater Quality Task Force which is located at 951 Turner Court, Suite 300, in Hayward.

This task force is a statewide organization representing municipal separate storm sewer systems that hold National Pollutant Discharge Elimination System, NPDES, permits to discharge stormwater.

My comments today are on behalf of the -- principally on behalf of that task force. I also am chairman of the management committee of the Alameda Countywide Clean Water Program. I will make some comments with respect to Alameda County.

As proposed by EPA, the preamble language, which is the principal point here in referring to numeric effluent limitations and water quality based effluent limitations, is clearly inconsistent with the plain language used by Congress in incorporating the maximum extent practicable standard into Section 402(p)(3)(B) of the Clean Water Act.

You may argue that this reference is only in the preamble and not in the main text of the rule; but it's my understanding, however, that the preamble itself is supposed to explain and clarify the meaning of the rule and the Clean Water Act. This proposed language would instead appear to be trying to change one of the fundamental points of the Clean Water Act.

The reason I think this point is fundamental is that the cost to society, and to our county in this case and to the states, is an important consideration. Congress considers the entirety of the tasks that the country has to do, rather than going for broke on one issue such as stormwater quality.

In short, the Congress balances the larger picture, and the language in Section 402(p)(3)(B) actually

reflects that balance. I believe that Section 402(p) says what it says for a good reason. The only economically feasible means of achieving water quality standards is through best management practices.

To illustrate this point, I work in Alameda County as chairman of the Clean Water Program there, and I did some rough calculations here. We often get storms as much as 2 inches in a 24-hour period. That's several times a winter. If you had a one-day storm, as I figure it, that will work out to 5 billion gallons of runoff water.

To treat this much water, if we were driven to this sort of the extreme case by the language in the preamble -- and I'm not talking about the text of the rule so much as the language in that preamble -- if it were to drive us in this extreme case to have -- to do end-of-pipe treatment for our discharges in order to meet the standards that are there, and to keep up -- basically keep up with the storms, which often come one behind the other within a couple days, it would necessitate building dozens, perhaps more, treatment plants of substantial size and would necessitate the use or acquisition of valuable industrial properties on the margins of the bay. Which I just did a little separate figuring here; I'm figuring it costs about $3 a gallon to treat -- to secondarily treat sanitary sewage and about $4 a gallon to store it.

I estimate that a storm of this size -- to be able to handle a storm of this size would cost between 35 and $50 billion for Alameda County alone. This is for a population of 1.35 million residents.

And this does not account for the acquisition of property needed to do this, assuming we could store it in facilities or properties we already own. And it also does not account for the secondary treatment. In fact, we might have some difficulty achieving the standards that are in the rule.

And there's a way you can express this getting down to the nuts and bolts of it, which I like to do. I did some rough estimates of the size of the Oakland Coliseum, and if you were to use structures the size of the Oakland Coliseum for storing this water from one of these storms, I figured it would come out to -- you'd need 50 of them to store the runoff from this one storm that I've got here.

And I know some of you might be thinking about how the A's are doing right now and this might not be a bad idea. We can, say, think about leaving an extra one there for the A's and Raiders and build 50 more of them.

But the point is, we're talking about a tremendous investment in the infrastructure here, and it's very difficult for us to keep up with.

So let's see. Just a few more points here.

So we're not really talking about upgrades to existing delivery and treatment systems. We would have to start from scratch and build pumping systems, conveyance systems, to build an entire infrastructure. The cost would be prohibitive for us in Alameda County. This is a -- sort of one of the worst-case scenarios. And I think that the economic rule -- or the economic analysis in the rule doesn't do this justice.

So --

MR. MORRIS: Have you done any modelling?

MR. HALE: This is strictly back-of-the-envelope type calculations at this point. I don't know whether or not -- what discharges the storm concentrations would result in.

The first question I have on modeling is to see what these discharges of stormwater with these effluent concentrations -- under the storm conditions if we would be -- would have a higher flow than the drought flow condition which was modeled.

When you have a storm event, the stream conditions are different, the hydrology is different, the modeling characteristics. We could work out the scenario. And it's true that when you've got a huge storm, water fires right out the bay and out the Golden Gate. We might even probably need to talk about that and work on that.

Response to: CTRH-001-001b

EPA disagrees with the comments. See response to CTR-001-003. For a discussion of EPA's evaluation of studies concerning costs associated with achieving water quality criteria for storm water discharges, see responses to Comments CTR-013-003 and CTR-040-004. For a discussion of the scientific validity of CTR criteria, See response to CTR-031-004c.

EPA disagrees with the cost estimates provided by the commenter as EPA does not believe that storage and treatment of stormwater would be required to ensure compliance with the CTR. See response to CTR-021-006b.

Comment ID: CTRH-001-029
Comment Author: Michelle Pla
Document Type: Public Hearing
State of Origin: CA
Represented Org: S.F. Public Utilities Com
Document Date: 09/17/97
Subject Matter Code: J Storm Water Economics
References:
Attachments? N
CROSS REFERENCES

Comment: We're going to submit more responses in written comments having to do with other issues such as wet weather. I would really encourage you to listen carefully to those who have experience in building wet weather facilities.

We know it costs $4 a gallon for storage. We know the latest cost of building treatment facilities is about $3 a gallon, so those are real numbers. And so I think you do need to pay attention to the wet weather issue as well.

Response to: CTRH-001-029

See response to CTR-021-006b and CTR-001-007.

Comment ID: CTRH-001-033
Comment Author: Dave Brent
Document Type: Public Hearing
State of Origin: CA

program to protect the environment.

Response to: CTRH-002-009

See responses to CTR-021-006b and CTR-034-016.

Comment ID: CTRH-002-017
Comment Author: Alex Sheydayi
Document Type: Public Hearing
State of Origin: CA
Represented Org: Ventura Co. Flood Control
Document Date: 09/18/97
Subject Matter Code: J Storm Water Economics
References:
Attachments? N
CROSS REFERENCES

Comment: MR. SHEYDAYI: Good afternoon. I'm Alex Sheydayi of the Ventura County Flood Control District, and I'm here to speak on behalf of the Ventura County Management Program.

Before I make my comments, I would also like to express my -- our program's support for the comments that were made by Mr. Crompton earlier and also by our speakers in San Francisco that spoke on behalf of the Municipal Water Quality Management Programs statewide.

Our program -- The permit for our program was issued in August of '94. And our program basically consists of 12 permittees in the flood control district which is the municipality and the municipal permittee which is the County of Ventura and ten cities in the county.

At the time that we applied for the stormwater permit, only three municipalities in the county were required to do so. The others entered the program voluntarily in order to maintain a uniform program countywide. Currently, of the 12 corporate permittees, five corporate permittees would not even be required to have permits under Phase 20 because they have populations far west than that required for Phase 20. So you can see we have very small communities that are participating in the program voluntarily.

The commission earlier stated that one of the reasons many of the corporate permittees entered the program voluntarily is to maintain a uniform program countywide. And one of the incentives for doing that was the fact that the program was a BMP-driven program to comply with the requirements of a permit to the maximum extent practicable under the Clean Water Act.

We have also recently completed a four-year monitoring program and, using the information from the monitoring program, we have attainability of the data that we have collected for our program. This attainability data indicates that even if we comply -- apply the BMP program to the maximum extent possible, the expenditure of radial funds, we would still not be able to meet the requirements of the proposed criteria for several of the metals and other constituents, which would then -- of course, our program would go into a treatment mode for stormwater discharges. We believe that this was going to be very costly for us, particularly very costly for smaller communities who don't have the base to spread the cost of such an expense over their population.

Our programs, like so many other municipal programs in California, were based on implementation of programs to address source of weakness, not to provide the treatment. Just to give you an idea of why we concur with the other speakers concerning the economic analysis and the fallacy of the economic analysis, let me just give you a very quick example of the cost that we are currently incurring. We are currently spending $5 per -- for every man, woman, and child in Ventura County to implement a BMP-based program. And yet if you'll look at the pages that were presented in the CTR of the maximum $87 million statewide, the number will be approximately two and a half to three dollars for every person in California to implement the CTR — not just the stormwater dischargers, but for all dischargers statewide. So we think that there is something wrong with this whole analysis if we are currently exceeding the cost of the assumptions made in the analysis for compliance with CTR.

We also, as I said earlier, believe that the analysis should take into consideration the size of the communities, and as Mr. Crompton mentioned earlier, most of the municipal programs in California are very small communities and the cost of applying the treatment would be very, very difficult for them to comply with.

That's the end of my comment. I thank you for the opportunity to speak.

MR. MORRIS: Are you going to submit the data and the analyses that you did that show why -- You said you have a lot of data. Are they going to --

MR. SHEYDAYI: We are not going to submit them on the comments. We are going to be submitting that data -- It's still relatively in raw form, but we will be submitting that data to the regional board with our annual report in November.

MR. MORRIS: If you could get me or send me a copy or Diane a copy of the data and how you calculated your WQBEL, your permit limit based on the new criteria, that would be useful. I'd like to see how you did that.

MR. SHEYDAYI: Okay. We'll send you whatever we can put together.

MR. MORRIS: I think there is a misconception that people have to implement the criteria for stormwater dischargers at the drought low condition and the 7QlO condition. That's not the case. When we issue a permit, you keep that limit for a stormwater discharge, you usually model the condition that occurs in. If you do it right, that gives you a model that gives you concentration in the receiving water and the duration of the exposure of that concentration, and then you'll compare that to the criterion and flood flow or rain flow or storm flow. Right? Usually you have enough to keep your WQBEL below the criteria and you don't see the effects. If you do a good model, you shouldn't have any impact.

If you look across the country, across the U.S., there are many, many states that have standards on the books, water quality standards that are far more stringent than the numbers we're promulgating or proposing to promulgate in Southern California. If you look at their standards, you won't see any black boxes on the end of those stormwater discharges. Nobody builds treatment for stormwater treatment in this country. They've been implementing standards for 15 years. California is no different.

Response to: CTRH-002-017

The costs attributable to the CTR are only those incremental costs which will be incurred to go from compliance with existing permits to compliance with more stringent CTR-based limits. EPA's revised

cost estimates from the Economic Analysis range from $33.5 million to $61.0 million annually. The commenter compares BMP costs of $5 per person to potential CTR compliance costs, however, this is not relevant because CTR costs are incremental costs and are not based on the costs of existing programs. See also responses to CTR-021-006b and CTR-035-048.

EXHIBIT "15"

ECONOMIC ANALYSIS OF THE CALIFORNIA TOXICS RULE

October 1999

Prepared for:

U.S. Environmental Protection Agency
Office of Science and Technology
401 M Street, S.W.
Washington, D.C. 20460

and

U.S. Environmental Protection Agency
Region 9
75 Hawthorne Street
San Francisco, California 94105

Prepared by:

Science Applications International Corporation
11251 Roger Bacon Drive
Reston, Virginia 20190

EPA Contract No. 68-C4-0046
SAIC Project No. 01-0833-01-1684-XXX

TABLE OF CONTENTS

Page

EXECUTIVE SUMMARY ES-1
BACKGROUND ES-1
PURPOSE OF THE ANALYSIS ES-2
BASELINES FOR ESTIMATING BENEFITS AND COSTS ES-3
ANALYSIS OF COSTS ES-4
Changes to the Methodology ES-4
Results ES-5
ANALYSIS OF BENEFITS ES-6
Qualitative Assessment of Benefits ES-6
Quantified and Monetized Assessment of Benefits ES-7
Contribution of Point Sources to Total Toxic Loadings ES-7
Human Health Benefits ES-8
Recreational Angling Benefits ES-9
Nonconsumptive Wildlife Recreation Values ES-11
Passive Use (Nonuse) Values ES-11
Summary of Monetized Benefits ES-12
COMPARISON OF BENEFITS AND COSTS ES-13
CONCLUSIONS ES-14

1.0 INTRODUCTION 1-1
1.1 BACKGROUND 1-1
1.2 PURPOSE OF THE ANALYSIS 1-1
1.3 STRUCTURE OF THE REPORT 1-3

2.0 NEED FOR THE REGULATION 2-1
2.1 STATUTORY REQUIREMENT 2-1
2.2 AN OVERVIEW OF ENVIRONMENTAL CONCERNS 2-1

3.0 BASELINE FOR ESTIMATING BENEFITS AND COSTS 3-1
3.1 POINT SOURCE DISCHARGES 3-1
3.1.1 Baseline Effluent Concentration 3-1
3.1.2 Baseline Pollutant Controls 3-2
3.2 WATER QUALITY 3-2
3.3 COSTS AND BENEFITS NOT ANALYZED 3-3
3.3.1 Agricultural Runoff 3-4
3.3.2 Inactive and Abandoned Mines 3-4
3.3.3 Urban Runoff 3-5

4.0 ANALYSIS OF COSTS AND COST-EFFECTIVENESS 4-1
4.1 METHODOLOGY 4-1
4.1.1 Method for Determining Reasonable Potential to Exceed CTR Water Quality Criteria 4-1
4.1.2 Method for Estimating Potential Costs 4-2
Cost Scenarios 4-4
Low Scenario 4-4
High Scenario 4-5
Extrapolation of Costs 4-5
4.1.3 Method for Estimating Pollutant Loading Reductions 4-5
4.1.4 Method for Estimating Costs to Indirect Dischargers 4-7
4.2 SUMMARY OF CHANGES TO DRAFT ANALYSIS 4-9
4.3 RESULTS 4-11
4.3.1 Low Scenario 4-11
4.3.2 High Scenario 4-12
4.4 POLLUTANT LOADING REDUCTIONS AND COST-EFFECTIVENESS 4-13
4.5 SOURCES OF UNCERTAINTY IN THE ANALYSIS 4-17

5.0 THE BENEFITS ASSOCIATED WITH THE CTR: METHODS AND CONCEPTS ... 5-1
5.1 ECONOMIC CONCEPTS APPLICABLE TO THE BENEFITS ANALYSIS 5-1
5.1.1 Economic Benefits 5-1
5.1.2 Benefit Categories Applicable to the CTR 5-2
Use Benefits 5-2
Passive Use (Nonuse) Benefits 5-3
5.1.3 The Concept and Applicability of Ecologic Benefits 5-3
5.2 LIMITATIONS INHERENT IN THE BENEFITS ANALYSIS 5-4
5.2.1 Causality: Linking the CTR to Beneficial Outcomes 5-4
5.2.2 Temporal and Spatial Issues 5-6
5.2.3 Attributions of Benefits to the CTR 5-7

6.0 QUALITATIVE ASSESSMENT OF POTENTIAL ECOLOGICAL BENEFITS 6-1
6.1 ECOLOGICAL DIVERSITY OF AQUATIC ENVIRONMENTS IN CALIFORNIA 6-1
6.2 OCCURRENCE AND ECOLOGICAL EFFECTS OF TOXICS IN CALIFORNIA AQUATIC SYSTEMS 6-2
6.2.1 Occurrence of Toxics-Related Impairments 6-2
6.2.2 Exposure Pathways 6-6
6.2.3 Potential Effects of Toxics on Ecological Resources 6-6
Effects on Biota 6-6
Effects on Ecosystems 6-10
6.3 POTENTIAL ECOLOGIC BENEFITS OF THE RULE 6-10

7.0 BENEFITS METHODOLOGY ISSUES: CONTRIBUTION OF POINT SOURCES TO TOXICS-RELATED WATER QUALITY PROBLEMS 7-1
7.1 SAN FRANCISCO BAY 7-1
7.2 OTHER BAYS AND ESTUARIES 7-4
7.3 FRESHWATER RESOURCES 7-6
7.4 SUMMARY 7-7

8.0 QUANTIFIED AND MONETIZED BENEFITS ESTIMATES 8-1
8.1 HUMAN HEALTH BENEFITS 8-1
8.1.1 Estimating the Exposed Population 8-3
San Francisco Bay 8-3
Freshwater Resources 8-5
8.1.2 Fish Consumption 8-5
8.1.3 Fish Tissue Contaminant Concentrations 8-6
San Francisco Bay 8-6
Freshwater Resources 8-7
8.1.4 Baseline Risk Levels 8-8
San Francisco Bay 8-9
Freshwater Resources 8-10
8.1.5 Potential Risk Reductions Attributable to the Rule 8-11
8.1.6 Uncertainties and Limitations 8-15
8.2 RECREATIONAL ANGLING BENEFITS 8-16
8.2.1 Value of an Improved Fishing Experience 8-16
Estimating Toxic-Impaired Fishing Days 8-17
Baseline Fishery Value 8-19
Potential Benefits Attributable to the CTR 8-20
8.2.2 Value of Increased Participation 8-21
Potential Benefits Attributable to the CTR 8-22
8.3 NONCONSUMPTIVE WILDLIFE RECREATION VALUES 8-24
8.4 PASSIVE USE (NONUSE) VALUES 8-24
8.4.1 Passive Use Values for Recreational Anglers 8-24
8.4.2 Passive Use Values for Non-Angling Households 8-26
WTP Values for Users and Nonusers 8-27
Lower-Bound Estimate 8-28
Upper-Bound Estimate 8-28
8.5 TOTAL VALUE OF SIMILAR IMPROVEMENTS 8-29
8.6 SUMMARY OF MONETIZED BENEFITS 8-29

9.0 COMPARISON OF POTENTIAL BENEFITS TO COSTS 9-1
9.1 COMPARISON OF ANNUALIZED BENEFITS AND COSTS 9-1
9.2 COMPARISON OF DISCOUNTED BENEFITS AND COSTS 9-1
9.3 CONCLUSIONS 9-2

10.0 REFERENCES 10-1

LIST OF APPENDICES

APPENDIX A. ALTERNATIVES ANALYSIS
APPENDIX B. COMPLIANCE COST DECISION MATRIX
APPENDIX C. DETAILED COST ESTIMATES

LIST OF EXHIBITS

Page

Exhibit ES-1. Summary of Potential Annualized Costs ES-6
Exhibit ES-2. Estimated Share of Total Toxic Pollutant Loadings Attributable to Point Sources for California Water Bodies ES-8
Exhibit ES-3. Potential Human Health Benefits of Reducing Cancer for Recreational Anglers ES-9
Exhibit ES-4. Summary of Annual Benefits from Implementation of the CTR ES-12
Exhibit ES-5. Comparison of Annual Potential Benefits and Costs of Implementing the CTR ES-13
Exhibit ES-6. Comparison of Discounted Benefits and Costs of Implementing the CTR ES-14

Exhibit 4-1. Toxic Weights of Pollutants Analyzed 4-8
Exhibit 4-2. New Minor Sample Facilities 4-9
Exhibit 4-3. Revised Waste Minimization/Pollution Prevention Cost Estimates 4-10
Exhibit 4-4. Summary of Potential Annualized Costs 4-11
Exhibit 4-5. Summary of Annual Costs by Discharger Category: Low Scenario 4-12
Exhibit 4-6. Summary of Annual Costs by Discharger Category: High Scenario 4-13
Exhibit 4-7. Baseline Pollutant Loadings and Reductions (Not Toxicity-Weighted, Lbs/yr) 4-14
Exhibit 4-8. Toxicity-Weighted Baseline Pollutant Loadings and Reductions (Lbs-eq/yr) 4-15
Exhibit 4-9. Ranking of Ten Highest Toxic-Weighted Pollutant Reductions 4-16
Exhibit 4-10. Annual Baseline Loads, Load Reductions, and Cost-Effectiveness 4-17
Exhibit 4-11. Estimated Incremental Cost-Effectiveness for Direct Dischargers by Industry 4-18
Exhibit 4-12. Biases and Uncertainties in the Analysis 4-19

Exhibit 5-1. Potential Benefits of Water Quality Improvements 5-2
Exhibit 5-2. Chain of Events in CTR Benefits Analysis 5-5

Exhibit 6-1. Summary of Baseline California Regional Water Quality Assessments 6-4
Exhibit 6-2. Biological Organization Levels Associated with Responses to Toxics in Water 6-7
Exhibit 6-3. Overview of Adverse Effects of Toxics 6-8

Exhibit 7-1. Estimated Contribution of Point Sources to Toxic Pollutant Loadings in San Francisco Bay (Toxic-Weighted) 7-3
Exhibit 7-2. Estimated Contribution of Point Sources to Toxic Pollutant Loadings in Other California Bays (Toxic-Weighted) 7-4
Exhibit 7-3. Estimated Contribution of Point Sources to Toxic Pollutant Loadings in California Rivers (Toxic-Weighted) 7-6
Exhibit 7-4. Estimated Share of Total Toxic Pollutant Loadings Attributable to Point Sources for California Water Bodies 7-8
Exhibit 7-5. Key Uncertainties in the Analysis of Relative Point Source Contribution .. 7-8

Exhibit 8-1. Fish Consumption Health Advisories in California 8-2
Exhibit 8-2. Density of Fishing Licenses in Relation to the Location of Point Source Dischargers in California 8-4
Exhibit 8-3. Consumption Rates for Recreational Anglers 8-6
Exhibit 8-4. Species Weights for San Francisco Bay Fish Consumption 8-7
Exhibit 8-5. Species Weights for Freshwater Fish Consumption 8-7
Exhibit 8-6. Toxicity Values and Contaminants Evaluated in Each Analysis 8-8
Exhibit 8-7. Baseline Cancer Risks for Recreational Anglers Consuming San Francisco Bay Fish 8-9
Exhibit 8-8. Baseline Systemic Risks for Recreational Anglers Consuming San Francisco Bay Fish 8-10
Exhibit 8-9. Baseline Cancer Risks for Recreational Anglers Consuming Freshwater Fish in California 8-11
Exhibit 8-10. Baseline Systemic Risks for Recreational Anglers Consuming Freshwater Fish in California 8-12
Exhibit 8-11. Estimated Reduction in Fish Tissue Contaminant Concentrations Due to Implementation of the CTR 8-13
Exhibit 8-12. Potential Effect of Implementation of the CTR on Cancer Risks for Recreational Anglers 8-14
Exhibit 8-13. Potential Human Health Benefits of Reducing Cancer After Implementation of the CTR to Recreational Anglers 8-14
Exhibit 8-14. Potential Effect of Implementation of the CTR on Systemic Risks for Recreational Anglers 8-15

Exhibit 8-15. Baseline Fishing Days Occurring in Toxic-Impaired Waters in California 8-18
Exhibit 8-16. Studies Revealing Estimates of Consumer Surplus per Fishing Day 8-19
Exhibit 8-17. Baseline Value of Fishing Days Occurring in Toxic-Impaired Waters in California 8-20
Exhibit 8-18. Potential Recreational Angling Benefits from a "Toxic-Free" Fishery Attributable to Implementation of the CTR 8-21
Exhibit 8-19. Potential Benefits from Increased Angling Participation 8-23
Exhibit 8-20. Relationship Between Willingness to Pay Values for Users and Nonusers 8-27
Exhibit 8-21. Summary of Annual Benefits from Implementation of the CTR 8-29
Exhibit 8-22. Key Omissions, Biases, and Uncertainties in the Benefits Analysis for the CTR 8-31

Exhibit 9-1. Comparison of Annual Potential Benefits and Costs of Implementing the CTR 9-1
Exhibit 9-2. Comparison of Discounted Benefits and Costs of Implementing the CTR . 9-2

EXECUTIVE SUMMARY

This document presents the U.S. Environmental Protection Agency's (EPA or the Agency) economic analysis of the California Toxics Rule (CTR), a regulatory action that establishes numeric water quality criteria for priority toxic pollutants necessary for the State of California to meet the requirements of the Clean Water Act (CWA).

BACKGROUND

Under the CWA, states have primary authority for establishing designated uses for water bodies and for developing water quality criteria to protect those designated uses. Under Section 303(c)(2)(B) of the CWA, whenever a state adopts new water quality standards, or reviews or revises existing water quality standards, it must adopt numeric water quality criteria for priority toxic pollutants (as defined by Section 307(a) of the CWA and for which the Agency has issued a criteria guidance document per Section 304(a) of the CWA) if the absence of such criteria could reasonably be expected to interfere with a designated use of a water body.

In April 1991, California adopted two statewide water quality control plans -- the Inland Surface Waters Plan (ISWP) and the Enclosed Bays and Estuaries Plan (EBEP) -- establishing water quality criteria for the state, in part, to comply with Section 303(c)(2)(B). In November 1991, EPA disapproved some portions of each plan. In December 1992, EPA promulgated the National Toxics Rule (NTR) (57 FR 60848, December 22, 1992) for several states that had not yet met the requirements of the CWA, including the State of California for those portions of the statewide plans that it had disapproved.

Shortly after the ISWP and EBEP were adopted, several parties filed lawsuits in State Court against the California State Water Resources Control Board (SWRCB) for not complying with state law when the two statewide water quality plans were adopted. In March of 1994, the State Court issued a final decision in a consolidated case requiring the SWRCB to rescind the two plans. The SWRCB took formal action to rescind the plans in September of 1994. Since then, the State of California has been without a complete set of water quality criteria for priority toxic pollutants because only the criteria promulgated by EPA in the 1992 NTR and criteria in existing Regional Basin Plans (issued by Regional Water Quality Control Boards) remain in effect. The CTR establishes the remaining criteria that will satisfy Section 303(c)(2)(B).

In California, the State is the National Pollutant Discharge Elimination System (NPDES) permit issuing authority. There are presently 184 major point sources of which 128 are publicly owned treatment works (POTWs) and 56 are industries that directly discharge to California's inland waters, enclosed bays, and estuaries. These major point sources may be impacted when the State implements water quality standards based on criteria in the final CTR. In addition there are 1,057 minor point source dischargers. These minor dischargers are not expected to incur significant impacts as a result of State implementation of CTR water quality criteria.

PURPOSE OF THE ANALYSIS

Under Executive Order (EO) 12866 (58 FR 51735, October 4, 1993), the Agency must determine whether a regulatory action is "significant" and therefore subject to the requirements of the EO [i.e., drafting an Economic Analysis (EA) and review by the Office of Management and Budget (OMB)]. EO 12866 defines "significant" as those actions likely to lead to a rule having an annual effect on the economy of $100 million or more, or adversely and materially affecting a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or state, local, or tribal governments or communities (also known as "economically significant").

Pursuant to the terms of the order, EPA has determined that this final rule is not "significant." The CTR establishes ambient water quality criteria which, by themselves, have no impact or effect. In addition, the costs and benefits of the CTR could be negligible since implementation of permits under the CTR may not differ significantly from how the state may implement permits under current law.[1] However, EPA also acknowledges that, in the absence of the rule, current permit requirements and current effluent concentrations may continue in the future. In this case there may be a cost to some dischargers for complying with new water quality standards after those standards are translated into permit limits. Therefore, consistent with the intent of EO 12866, EPA developed this EA. EPA intends for the EA to inform the public about how entities might be affected by implementation of CTR-based water quality standards in the NPDES permit program.

The State of California has significant flexibility and discretion as to how it chooses to implement the CTR within the NPDES permit program. EPA's analysis assumes implementation procedures based on a combination of EPA guidance and current permit conditions for the facilities examined. This is appropriate because if the state does not adopt statewide implementation provisions, the CTR-based water quality standards would be implemented using existing state basin plan provisions and EPA regulations and guidance. However, a more precise measure of costs and benefits may not be known until the state adopts its implementation provisions.

This economic analysis develops revised estimates of the potential benefits and costs associated with implementing the CTR (EPA is promulgating the rule as final). EPA revised its analysis in response to comments on the EA that accompanied the proposed rule and to reflect more recent data and information to refine the analysis of benefits and costs. Wherever possible, the costs and benefits are expressed in monetary terms.

---

[1] That is, the state could rely on its narrative toxicity standard and implementation of the standard using best professional judgment to set numeric water quality-based effluent limits for toxic pollutants in permits. Federal permit regulations (40 CFR 122.44(d)(1)(vi); 40 CFR 123.25) require that each permit contain effluent limits for toxic pollutants when a pollutant has reasonable potential to cause or contribute to an excursion above a state's narrative standard. The basis for such limits could include EPA's 304(a) criteria guidance or other appropriate scientific information. Therefore, this approach could result in permit limits that are nearly identical to those that would result from implementation of CTR-based numeric standards, which are also based on the latest available scientific information.

BASELINES FOR ESTIMATING BENEFITS AND COSTS

Analysis of the potential benefits and costs associated with implementing the CTR requires that a baseline be established. The baseline describes what would occur in the absence of a regulation and provides an initial starting point for measuring the incremental cost and benefit of regulatory compliance.

EPA established potential compliance costs under two scenarios of pollutant loadings from point source dischargers. For a low cost scenario, EPA established pollutant loadings based on effluent data, specifically, the maximum effluent concentration reported in the most recent three years of monitoring data. However, if this value exceeded an existing permit limit for a given pollutant (i.e., showing the facility to be out of compliance), EPA used the permit limit as the discharge concentration. As a high scenario, EPA established pollutant loadings based on effluent data or the existing permit limit if no data were available. EPA developed these scenarios to reflect the uncertainty associated with establishing existing levels of pollutants in the effluents of point source dischargers given the limitations of current analytical methods. That is, because the CTR criteria are often below current analytical detection levels, it can be difficult to determine whether a facility may face incremental costs under the rule.

Establishing a baseline for estimating potential benefits proved more difficult because EPA does not have information on water quality conditions that would result from implementation of all current regulations and programs designed to control toxic pollutants. Therefore, EPA established a water quality baseline using information on current conditions using California's Water Quality Assessment (WQA) database, a database developed and maintained by the SWRCB. The WQA database contains information on pollutants that adversely affect water quality in water bodies that have been evaluated, the sources of these pollutants, the beneficial uses impaired, and a rating of water quality. The WQA database used for the analysis was updated in 1994 and is described in detail in U.S. EPA (1996). To identify the extent to which California waters are impaired by the toxic pollutants addressed by the CTR, EPA relied on the WQA ratings of good, medium, and poor. EPA defined impaired waters for this analysis as those that are rated medium or poor for one or more toxic pollutants addressed by the CTR [although, as described in U.S. EPA (1996), an exact matching of the WQA database to the pollutants addressed by the CTR was not possible].

EPA also obtained baseline information related to potential benefits from California's Toxic Substances Monitoring Program (TSMP). The TSMP monitors the occurrence of toxic pollutants in California's waters through sampling and analysis of fish tissue and contains freshwater tissue samples collected throughout the state. Fish tissue contaminant levels also were obtained from EPA's 1992 National Study of Chemical Residues in Fish and from a 1994 study by the San Francisco RWQCB, Contaminant Levels in Fish Tissue from San Francisco Bay. These sources also are described in detail in U.S. EPA (1996).

ANALYSIS OF COSTS

The method used to estimate potential compliance costs associated with the final CTR is generally the same as that used to estimate costs of the proposed rule. However, to address comments raised during the public comment period, EPA gathered additional data and information to refine the analysis of potential costs and pollutant loading reductions. A large part of the effort was directed toward obtaining the most recent NPDES permits and effluent monitoring data. Efforts also were directed toward increasing the sample size of minor wastewater treatment plants and minor industrial facilities.

EPA's method involved developing detailed estimates of the potential impact of the CTR on a sample of point source dischargers to California's inland waters and enclosed bays and estuaries and then extrapolating these results to the universe of potentially affected facilities. The impact of the CTR will vary depending upon the procedures that will be used to implement the criteria. These procedures typically specify the methods for assessing the need for water quality based effluent limits (WQBELs) and, if WQBELs are required, the method for deriving WQBELs from applicable water quality criteria. For this analysis, EPA derived WQBELs using implementation procedures based on the methods recommended in the Technical Support Document for Water Quality-based Toxics Control (TSD) (U.S. EPA, 1991).

Where reasonable potential was determined for a pollutant at a facility, EPA calculated a projected CTR-based WQBEL in accordance with the TSD procedures. If the existing NPDES limit was more stringent that the CTR-based limit, then no cost or load reductions were assigned to the facility. However, if the CTR-based limit was more stringent than the existing NPDES permit limit, or, in the absence of a existing limit, if the CTR-based limit was more stringent than the maximum observed effluent concentration, EPA estimated the cost that the facility would likely incur to meet the more stringent limit. To estimate these costs, EPA established a decision framework to ensure consistency in selecting control options.

Changes to the Methodology

In analysis of the final CTR, EPA revised its methodology for calculating a projected effluent quality (PEQ) to address mathematical problems encountered due to limited data sets for some facilities. Based on a review of the available data, EPA determined that using one-half of the method detection level instead of "zero" for non-detects resulted in a more accurate coefficient of variation. Furthermore, if greater than 20 data points were available for a pollutant, the 99th percentile value was calculated from the data set to represent the PEQ.

Changes to the methodology also included revisions to the treatment process optimization costs and waste minimization/pollution prevention cost estimates. Because process modification costs are expressed as a range of values, the costs assigned for a facility were proportional to the flow to be treated and the loading reduction required. For waste minimization/pollution prevention, the cost for POTWs with a design flow greater than five MGD was increased from $400,000 to $2 million in the high scenario. This new cost, replacing the previous average per facility cost of $100,000, is the highest pollution prevention cost estimate derived by EPA in assessing of

compliance costs resulting from implementation of the proposed Great Lakes Water Quality Guidance (SAIC, 1993).

EPA also eliminated the use of a cost "trigger" under the high scenario. In analysis of the proposed CTR, EPA used an industrial category threshold of $500/pounds-equivalent (lb-eq) for triggering compliance through regulatory alternatives. (The low scenario used a facility-specific threshold of $200/lb-eq for triggering compliance thru regulatory alternatives.) However, for the final rule, EPA assumed that no regulatory alternatives would be available under the high scenario. In other words, all necessary pollutant reductions were assumed to be achieved through either treatment or a waste control program of some type (e.g., waste minimization, pollution prevention).

Finally, EPA revised its estimate of the number of indirect dischargers that may be affected by more stringent CTR-based WQBELs applied to POTWs. EPA estimated that there are 2,144 SIUs that discharge to POTWs located on California inland surface waters and enclosed bays and estuaries. Previously, EPA assumed that 30% of these SIUs would be impacted under the low scenario and 10% would be impacted under the high scenario. Based on comments received indicating that the number of facilities affected was understated, EPA increased these percentages to 70% for the low scenario and 30% for the high scenario. (The percentage of SIUs impacted under the low scenario is greater than under the high scenario because the low scenario relies more heavily on source controls as a low-cost control option.) However, EPA believes that these revised assumptions are unrealistic and that the original 30% and 10% estimates more closely reflect the likely impact.

Results

EPA estimates that the potential annual cost of implementing the CTR is approximately $33.5 million under the low scenario and $61.0 million under the high scenario. As shown in **Exhibit ES-1**, indirect dischargers bear most of these costs in the low scenario. Under the high scenario, direct dischargers are expected to incur most of the potential costs. However, EPA believes that the high scenario likely overstates potential costs because it reflects the use of conservative (i.e., tending to err on the high side) assumptions. Specifically, under the high scenario, EPA estimates potential costs based solely on the presence of a WQBEL in a permit (as opposed to having monitoring data to show that the pollutant is actually there) and assumes that regulatory alternatives will not be used to mitigate excessive cost impacts.

Under the low scenario, where the baseline represents existing effluent concentrations, the expected reduction in pollutant loadings resulting from implementation of the CTR is approximately 1.1 million toxic lb-eq per year, or 50% of the baseline load of 2.2 million toxic lb-eq per year. Under the high scenario, the expected reduction in pollutant loadings is approximately 2.7 million toxic lb-eq per year, or 15% of the baseline load of 18.5 million toxic lb-eq per year.

Exhibit ES-1. Summary of Potential Annualized Costs (Millions of 1998 First Quarter Dollars)

Discharger Category	Low Scenario	High Scenario
Direct Dischargers	$9.9	$50.9
Indirect Dischargers	$23.6	$10.1
Total	**$33.5**	**$61.0**

ANALYSIS OF BENEFITS

EPA developed both a qualitative assessment of benefits and a quantified and monetized assessment of benefits.

Qualitative Assessment of Benefits

Toxics reductions under the CTR may provide ecologic benefits through increased ecosystem stability, resilience, and overall health. The potential benefits are difficult to quantify because of the complexity, scale, and uncertainties of the interaction of the multitude of ecological systems and toxics to be affected by the final rule. However, because of the extensive variety, proportion, and geographic area of the affected aquatic systems, the diversity and uniqueness of California ecological resources, and the large number of toxics to be regulated under the CTR, these benefits may be substantial, including (U.S. EPA, 1997):

- Reductions in toxics loadings that lead to improved conditions for California fish spawning and/or migration in bays/harbors and estuaries, lakes, rivers, streams, and saline lakes

- Reductions in bioaccumulative chemicals of concern that currently may affect fish and wildlife throughout the state, including selenium, mercury, PCBs, dioxins, and chlorinated pesticides

- Reductions in toxics that improve conditions for the successful recovery of federal and state threatened and endangered species, such as the delta smelt, desert pupfish, California brown pelican, bald eagle, California clapper rail, California tiger salamander, and western snowy plover

- Reductions in toxics that decrease adverse toxics-related impacts on aquatic and terrestrial wildlife in two important areas of California: the San Francisco Bay watershed and the Central Valley (see case studies in U.S. EPA, 1997)

- Reductions in the concentrations of both selenium and pesticides in the waters that feed the Salton Sea that may improve conditions for the restoration and maintenance of currently declining populations of wildlife, including threatened and endangered species such as the California brown pelican, peregrine falcon,

bald eagle, Yuma clapper rail, and desert pupfish (see Case Studies in U.S. EPA, 1997)

- Improved water quality and associated improvements in survival, growth, and reproductive capacity of aquatic and aquatic-dependent organisms that will help restore and sustain California's ecological diversity.

Quantified and Monetized Assessment of Benefits

EPA's method for estimating the potential benefits of the CTR closely resembles the method used in evaluation of the proposed CTR (the results have been updated to incorporate the revised estimates of pollutant loading reductions and a slight modification to how the reductions are incorporated). EPA quantified and monetized three categories of potential benefits: (1) human health risk reductions, (2) recreational angling benefits, and (3) passive use values. However, in response to comments, EPA conducted additional searches to identify California-specific literature related to the contribution of point sources to the toxic-related water quality problems in California and the values held by California residents for reducing toxic contamination in the state's waters. EPA incorporated the results of these searches into this analysis. Also, where possible, EPA updated the data underlying the analysis.

Contribution of Point Sources to Total Toxic Loadings

EPA's method for estimating potential benefits generally involved estimating the value of eliminating toxic impairment from California waters and then determining the extent to which the potential loadings reductions associated with the CTR might contribute to that value. For this analysis, EPA assumed that there was a direct linear relationship between the estimated reduction in toxic-weighted pollutant loadings and potential benefits (although this assumption may or may not be correct). EPA also developed assumptions regarding the relative share of total toxic loadings to California waters that are attributable to point sources. These estimates are shown in **Exhibit ES-2** and represent the toxic-weighted average across the pollutants evaluated.

ES-2. Estimated Share of Total Toxic Pollutant Loadings Attributable to Point Sources for California Water Bodies

Water Body	Toxic Pollutant Loadings Attributable to Point Sources (%)
San Francisco Bay	1-10
Other bays and estuaries	42–64[1]
Freshwaters and saline lakes	3

[1] The lower-bound estimate is for nonurban bays and the upper-bound estimate is for urban bays.
Source: Based on EPA analysis of NOAA (1988a); NOAA (1988b); NOAA (1988c); Davis, et al. (1991); California RWQCB (1997); Central Valley RWQCB; and California 1994 WQA database, as originally presented in U.S. EPA (1997).

Human Health Benefits

EPA assessed the human health risks from the consumption of contaminated fish tissue, and the potential reductions in these risks for two populations of anglers: San Francisco Bay anglers and freshwater anglers in California. EPA conducted the assessment for San Francisco Bay anglers as a case study example of the health risks for anglers fishing in enclosed bays and estuaries. However, because only two other health advisories have been issued for enclosed bays and estuaries in California, this case study may represent an upper-bound estimate of baseline health risks associated with enclosed bays and estuaries.

EPA assessed baseline human health risks (cancer and systemic effects) based on reported contaminant levels in fish tissue samples collected from San Francisco Bay and freshwater fisheries throughout California. The approach used follows standard EPA methodology for estimating health risks as described in detail in U.S. EPA (1997). EPA then estimated the potential reduction in baseline risk levels that might result from implementation of the CTR, considering the relative contribution of point sources to the contamination problem.

Exhibit ES-3 presents the potential reductions in cancer risks for recreational anglers. EPA estimated reductions in statistical cancer cases for anglers with average consumption rates. The lower-bound estimate of reductions in statistical cancer cases is less than one because the lower-bound estimates of statewide loadings reductions for all carcinogens that accumulate in fish is small. Using an estimated value of a statistical life of $2.7 million to $9.6 million (American Lung Association, 1995, updated to 1998 first quarter dollars using the Consumer Price Index) and assuming that all cancers are fatal, potential human health benefits of reduced cancer cases in recreational anglers range from $0.10 million to $4.20 million per year.

Exhibit ES-3. Potential Human Health Benefits of Reducing Cancer for Recreational Anglers[1]

Water Body	Annual Reduction in Cancer Cases	Annual Monetized Benefits (millions of 1998 first quarter dollars)[1]
San Francisco Bay	0.04 - 0.05	$0.10 - $0.45
Freshwater Resources	0.44	$1.17 - $4.20

[1] Based on an average consumption rate (21.4 g/day) and a value of a statistical life of $2.7 million to $9.6 million (American Lung Association, 1995, updated to 1998 first quarter dollars using the CPI). Values based on the estimates of reductions in fish tissue concentration contamination. Note that there is currently a debate regarding the accuracy of the CPI.

Systemic (noncancer) risks are assessed by means of a hazard quotient (HQ) for each contaminant. A HQ of one or greater implies that chronic chemical exposures exceed EPA-established thresholds of toxicity, and are indicative of potential for adverse health effects. For PCBs, EPA expects the hazard quotient associated with the average consumption rate to be reduced from 2.26 to a range of 1.51-1.66 for San Francisco Bay anglers and from 1.40 to 1.01 for freshwater anglers. However, for high consumers (90th percentile), the HQ for PCBs is expected to be reduced from 11.31 to a range of 7.54-8.29 for San Francisco Bay anglers and from 7.02 to 5.04 for freshwater anglers.

EPA estimated that the HQ for mercury will be reduced for both the average and 90th percentile consumption rates, however baseline levels exceed 1.0 for high consumers only. For high fish consumers (90th percentile), EPA expects the HQ for mercury to be reduced from 3.77 to a range of 1.01-1.11 for San Francisco Bay anglers and from 3.12 to 0.90 for freshwater anglers.

Recreational Angling Benefits

In addition to health risks, concerns regarding adverse health effects from eating contaminated fish also may reduce the value of the recreational fishery because the ability to consume fish may be an important attribute of the overall fishing experience (Knuth and Connelly, 1992; Vena, 1992; FIMS and FAA, 1993; West et al., 1993). This reduction in value may occur because fewer fishing trips are taken or because the value of a trip is reduced. In addition, reduced toxic contamination may increase stability, resilience, and overall health of numerous ecosystems, which may increase catch rates as well as angling effort in California. Thus, the potential recreational benefits of the CTR may include an increase in the value of fishing experiences and an increase in participation.

Because the analysis of recreational angling value is conducted at the statewide level and does not consider numerous site-specific characteristics that will affect the level of benefits from the rule, the results are only intended to provide a rough approximation of the potential magnitude of recreational benefits. A case study approach would be required to more accurately characterize the anticipated angling benefits at any specific water body in California.

Increased Value of Existing Trips. EPA was unable to identify any studies regarding the value to California anglers of reducing toxic contamination of surface waters to help estimate the value of

an improved fishing experience. However, a 1992 study of the Wisconsin Great Lakes open water sport fishing (Lyke, 1993) does reveal the significance of the contamination problem to the anglers. Lyke estimated the value of the Great Lakes trout and salmon fishing to anglers if it were "completely free of contaminants that may threaten human health." Lyke's estimates indicate benefits of 11% to 31% of the value of the fishery.

To transfer the Lyke results, EPA first estimated the number of fishing days in California that occur in toxic-impaired waters, distinguishing between water body type (e.g., freshwater river versus saltwater). Next, EPA multiplied the number of fishing days by an average consumer surplus for the different modes of fishing to obtain a baseline value of the fishery. EPA then multiplied by Lyke's estimate of 11% to 31% to obtain the value of a "contaminant-free" fishery. Finally, EPA multiplied by the midpoint of the low and high estimates of expected reduction in loadings and the low and high assumed contribution of point sources to total loadings to obtain the portion of these benefits that may be potentially attributable to point source controls. This approach results in potential benefits of between $1.53 million and $12.99 million per year.

Value of Increased Participation. In addition to increasing the value of existing angling days, reduced toxic loadings also may increase participation levels. Toxic contamination may discourage recreational fishing participation because of concern that consumption is unsafe. Similarly, knowledge of toxic contamination alone, regardless of consumption concerns, may reduce anglers' participation at a given site. Improving water quality to achieve toxic water quality criteria may restore this lost participation.

However, estimating lost participation is difficult and a limited number of studies have estimated reductions in participation due to water quality degradation. A thorough review of the literature revealed several studies that estimate the percentage of *people* that would take fewer trips, not the percentage decrease in angling days. However, these anglers are not expected to eliminate trip-taking. Therefore, using the various study results, EPA reasonably assumed that there may be a 5% to 10% reduction in trips attributable to poor water quality. Because public knowledge of toxic contamination varies across water bodies, EPA conservatively assumed a 5% increase in angler participation in estimating the benefits from increased angling participation for all waters except San Francisco Bay. Since a fish consumption advisory was issued for the Bay in 1994, EPA assumed a 10% increase in angler participation for the Bay.

EPA estimated the value of increased angling participation by multiplying the number of toxic-affected fishing days by 5% (10% for San Francisco Bay) and then valuing these days using estimated consumer surplus values. To estimate the portion of these benefits attributable to implementation of the CTR, EPA multiplied by the midpoint of expected reduction in toxic-weighted pollutant loadings and the relative contribution of point sources to total loadings. Potential benefits due to increased participation that may be attributable to the CTR range from $0.7 million per year to $2.2 million per year.

Nonconsumptive Wildlife Recreation Values

The *1996 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation* (U.S. Department of the Interior, Fish and Wildlife Service, and U.S. Department of Commerce, Bureau of the Census, 1998) indicates that 5.96 million California residents aged 16 or older participated in wildlife watching in 1996. This participation included 17.9 million trips away from home (at least 1 mile) for the primary purpose of observing, photographing, or feeding wildlife. These estimates do not include secondary wildlife-watching activities, such as observing wildlife while pleasure driving (U.S. Department of the Interior, Fish and Wildlife Service, and U.S. Department of Commerce, Bureau of the Census, 1998). Approximately 5.7 million California residents aged 16 or older also participated in wildlife-related activities around the home, including observing, photographing, or feeding wildlife.

Research has shown that nonconsumptive wildlife recreation (viewing wildlife) is highly valued. For example, Rockel and Kealy (1991) estimate a total annual value nationwide of between $8.7 billion and $165 billion in 1980 dollars (with the range of results indicating a sensitivity of their model to functional form). Cooper and Loomis (1991) estimated the total annual value for bird viewing in California's San Joaquin Valley to be $64.7 million (in 1987 dollars), based on willingness to pay (WTP) estimates for all Californians. Cooper and Loomis found that WTP increased as the number of birds seen increased, with diminishing marginal returns evident in their results (Cooper and Loomis, 1991).

As described in the EA that accompanied the proposed rule, CTR-related improvements in aquatic habitats may lead to healthier and more diverse populations of avian and terrestrial species and may manifest in increased participation and increased user day values for wildlife viewing activities. Without specific information as to the potential magnitude of changes in wildlife populations and thus viewing opportunities that may result from the toxic pollutant loading reductions anticipated under the rule, nonconsumptive wildlife recreation values cannot be estimated. Given the high baseline value, however, these benefits may be appreciable.

Passive Use (Nonuse) Values

Individuals may value reduced toxic concentrations in California aquatic environments apart from any values associated with their direct or indirect use of the resource. These passive use (nonuse) values are difficult to estimate in the absence of carefully designed and executed contingent value surveys. "Benefits transfer" techniques, however, can be used to develop a rough approximation of the potential magnitude of these passive use values.

Fisher and Raucher (1984) conducted an extensive review of the economics literature providing empirical evidence of the use and nonuse values associated with improved water quality and/or fisheries. Their review indicated that nonuse values are estimated to be *at least* half as great as recreational values. The authors concluded that if passive use values (for example, ecologic values) are applicable to a policy action, using a 50% approximation is preferred, with proper caveats, to omitting passive use values from a benefit-cost analysis. EPA believes his research is

applicable to the CTR. Therefore, EPA estimated passive use values for the CTR as one-half of recreational fishing benefits thus estimating the amount of passive use value that recreational angling households are willing to pay, above their recreational use values, to preserve or enhance water quality. This suggests that the potential magnitude of passive use values associated with implementation of the CTR for households with recreational anglers may range from $1.1 million per year to $7.6 million per year.

EPA also estimated passive use values for nonangling households assuming that passive use values are 30% to 90% of the passive use values held by angling households. Assuming that there are 9.7 million nonangling households in California, EPA anticipates passive use benefits for nonangling households range from $2.3 million to $47.3 million per year.

Summary of Monetized Benefits

A summary of the estimated monetized benefits from implementation of the CTR is provided in **Exhibit ES-4**. Human health benefits are estimated for San Francisco Bay and statewide freshwater resources; all other benefits are estimated statewide.

Exhibit ES-4. Summary of Annual Benefits from Implementation of the CTR (Millions of 1998 First Quarter Dollars)

Benefit Category	Annual Value
Human Health (cancer risk)	
San Francisco Bay	$0.1 - $0.4
Other saltwater resources	+
Freshwater resources	$1.2 - $4.2
Recreational Angling	
Increased value of existing trips	$1.5 - $13.0
Increased participation	$0.7 - $2.2
Wildlife Viewing	+
Passive Use	
Households with recreational anglers	$1.1 - $7.6
Other households	$2.3 - $47.3
Omitted Benefits[1]	+
Total	$6.9 - $74.7

[1] Benefits not monetized include noncancer human health effects, water-related recreation apart from fishing, and consumptive and nonconsumptive land-based recreation.
+: Positive benefits expected but not monetized.

The benefits estimates are subject to a number of omissions, biases, and uncertainties. It is difficult to assess the overall impact of these factors on the estimates because the degree to which they might cause the estimates to be underestimated or overestimated cannot be predicted with accuracy. Among the key factors, however, the omission of potential benefit categories may have the most significant impact and would contribute to an underestimate of benefits. In particular, the inability to quantify and monetize the extent to which the CTR may enhance water-related recreation apart from fishing or consumptive and nonconsumptive land-based

recreation, such as picnicking and hunting, may cause an underestimate of benefits. Although the scope of the benefits analysis has not allowed a quantitative assessment of these values at either baseline or post-CTR conditions, these benefits may be appreciable.

COMPARISON OF BENEFITS AND COSTS

A direct comparison of the monetized annual (steady-state) benefits of the CTR and annualized costs shows benefits and costs to be generally commensurate given the uncertainty in the analysis and that several categories of benefits are unmonetized. As shown in **Exhibit ES-5**, the estimate of monetized benefits ranges from $6.9 million per year to $74.7 million per year. Annualized costs are $33.5 million under the low scenario and $61.0 million under the high scenario.

Exhibit ES-5. Comparison of Annual Potential Benefits and Costs of Implementing the CTR (Millions of 1998 First Quarter Dollars)

Comparison Method	Monetized Benefits	Annualized Costs	
		Low Scenario	High Scenario
Direct Annual Comparison[1]	$6.9 - $74.7	$33.5	$61.0

[1] These monetized costs and benefits are not directly comparable since several categories of benefits have not been monetized.

Because the benefits and costs associated with implementation of the CTR may be characterized by an initial outlay of capital costs and a gradual phase-in of benefits, **Exhibit ES-6** presents a present value of benefits and costs over 30 years. This method applies a present value social accounting in which the streams of future benefits and costs are discounted to their present values to reflect society's rate of time preference. EPA considered two different phase-in scenarios to account for the potential delay in realizing benefits since many of the pollutants addressed by the CTR are persistent in the environment. To the extent that benefits of reducing toxic pollutants under the CTR are realized sooner, these scenarios may result in an underestimate of the present value of benefits. EPA assumed that there is a 7% opportunity cost of capital and that capital is replaced every 10 years. Since the life of capital typically exceeds 10 years, this assumption may result in an overestimate of costs. EPA calculated the present value of the streams of benefits and costs using discount rates of 3% and 7%.

As shown in Exhibit ES-6, discounted costs fall within the range of discounted benefits under the low scenario, but discounted costs exceed discounted benefits in three of the four cases shown for the high scenario. However, the assumption that capital is replaced every 10 years likely overstates costs. At the same time, benefits may be understated because some categories are not monetized and full benefits may be realized sooner than 10 or 20 years. Thus, EPA expects that the present value of benefits and costs is more commensurate than shown.

Exhibit ES-6. Comparison of Discounted Benefits and Costs of Implementing the CTR (Millions of 1998 First Quarter Dollars)[1]

Schedule of Benefits	Benefits[2]	Costs[3]	
		Low	High
3% Discount Rate			
10-Year Phase-In of Benefits	$108-$1166	$617	$1033
20-Year Phase-In of Benefits	$82-$883	$617	$1033
7% Discount Rate			
10-Year Phase-In of Benefits	$63-$683	$421	$767
20-Year Phase-In of Benefits	$45-$480	$421	$767

[1] Present values over 30 years.
[2] Benefits are phased in proportionately over 10 and 20 years, and have their full value in the remaining years. Benefits are not directly comparable to costs since several categories of benefits have not been monetized.
[3] Reflects capital costs plus a 7% cost of capital in years 1, 11, and 21, operating and maintenance costs in years 2 through 30.

CONCLUSIONS

Comparison of annual values of benefits and costs resulting from implementation of the CTR shows estimated costs falling within the range of monetized benefits. Comparison of 30-year present values of benefits and costs also shows costs under the low scenario to fall within the range of monetized benefits although costs under the high scenario generally fall just outside this range. However, EPA believes that benefits may actually be higher than shown because some categories of potential benefits have not been quantified or monetized. EPA was not able to quantify or monetize potential improvements in water-related recreation apart from fishing, such as boating, swimming, picnicking, and related in-stream and stream-side recreational activities. EPA was also unable to quantify or monetize potential improvements in wildlife viewing. Research indicates that wildlife viewing is a highly valued activity and that California residents value reductions in toxic pollutants that may affect wildlife resources. Thus, these omissions may result in an underestimate of benefits. In addition, using a capital life of 10 years likely overestimates potential compliance costs.

1.0 INTRODUCTION

This document presents the U.S. Environmental Protection Agency's (EPA or the Agency) economic analysis of the California Toxics Rule (CTR), a regulatory action that establishes numeric water quality criteria for priority toxic pollutants necessary for the State of California to meet the requirements of the Clean Water Act (CWA).

1.1 BACKGROUND

Under the CWA (33 U.S.C. 1251 et seq.), states have primary authority for establishing designated uses for water bodies and for developing water quality criteria to protect those designated uses. Under Section 303(c)(2)(B) of the CWA, whenever a state adopts new water quality standards, or reviews or revises existing water quality standards, it must adopt numeric water quality criteria for priority toxic pollutants (as defined by Section 307(a) of the CWA and for which the Agency has issued a criteria guidance document per Section 304(a) of the CWA) if the absence of such criteria could reasonably be expected to interfere with a designated use of a water body.

In April 1991, California adopted two statewide water quality control plans, the Inland Surface Waters Plan (ISWP) and the Enclosed Bays and Estuaries Plan (EBEP) establishing water quality criteria for the state, in part, to comply with Section 303(c)(2)(B). In November 1991, EPA disapproved some portions of each plan. In December 1992, EPA promulgated the National Toxics Rule (NTR) (57 FR 60848, December 22, 1992) for several states that had not yet met the requirements of the CWA, including the State of California for those portions of the statewide plans that it had disapproved.

Shortly after the ISWP and EBEP were adopted, several parties filed lawsuits in State Court against the California State Water Resources Control Board (SWRCB) for not complying with state law when the two statewide water quality plans were adopted. In March of 1994, the State Court issued a final decision in a consolidated case requiring the SWRCB to rescind the two plans. The SWRCB took formal action to rescind the plans in September of 1994. Since then, the State of California has been without a complete set of water quality criteria for priority toxic pollutants: only the criteria promulgated by EPA in the 1992 NTR and criteria in existing Regional Basin Plans (issued by Regional Water Quality Control Boards) remain in effect. The CTR establishes the remaining criteria that will satisfy Section 303(c)(2)(B).

1.2 PURPOSE OF THE ANALYSIS

Under Executive Order (EO) 12866 (58 FR 51735, October 4, 1993), the Agency must determine whether a regulatory action is "significant" and therefore subject to the requirements of the EO [i.e., drafting an Economic Analysis (EA) and review by the Office of Management and Budget (OMB)]. EO 12866 defines "significant" as those actions likely to lead to a rule having an annual effect on the economy of $100 million or more, or adversely and materially affecting a

sector of the economy, productivity, competition, jobs, the environment, public health or safety, or state, local, or tribal governments or communities (also known as "economically significant").

Pursuant to the terms of the order, EPA has determined that the CTR is not a "significant" rule. The CTR establishes ambient water quality criteria which, by themselves, have no impact or effect. In addition, the costs and benefits of the CTR could be negligible since implementation of permits under the CTR may not differ significantly from how the state may implement permits under current law.[1] However, EPA also acknowledges that, in the absence of the rule, current permits that do not contain numeric effluent limitations for toxic pollutants and current effluent concentrations may continue in the future. In this case there may be a cost to some dischargers for complying with new water quality based effluent limitations after those standards are translated into permit limits. Therefore, consistent with the intent of EO 12866, EPA developed this EA. EPA intends for the EA to inform the public about how entities might be affected by implementation of CTR-based water quality standards in the National Pollutant Discharge Elimination System (NPDES) permit program.

The State of California has significant flexibility and discretion as to how it chooses to implement the CTR within the NPDES permit program. EPA's analysis assumes implementation procedures based on a combination of EPA guidance and current permit conditions for the facilities examined. This is appropriate because if the state does not adopt statewide implementation provisions, the CTR-based water quality standards would be implemented using existing state basin plan provisions, and EPA regulations and guidance. However, a more precise measure of costs and benefits may not be known until the state adopts its implementation provisions.

This analysis develops revised estimates of the potential benefits and costs associated with implementing the CTR. EPA revised its analysis in response to comments on the EA that accompanied the proposed rule and to reflect more recent data and information collected and used to refine the analysis of benefits and costs. These data and analyses are described in detail in the chapters that follow.

[1] That is, currently, even without this rule, the state could rely on its narrative toxicity standard and implementation of the standard using best professional judgment to set numeric water quality-based effluent limits for toxic pollutants in permits. Federal permit regulations (40 CFR 122.44(d)(1)(vi); 40 CFR 123.25) require that each permit contain effluent limits for toxic pollutants when a pollutant has reasonable potential to cause or contribute to an excursion above a state's narrative standard. The basis for such limits could include EPA's 304(a) criteria guidance or other appropriate scientific information. Therefore, this approach could result in permit limits that are nearly identical to those that would result from implementation of CTR-based numeric standards, which are also based on the latest available scientific information.

1.3 STRUCTURE OF THE REPORT

This document identifies the need for the regulation, assesses potential costs and benefits, and analyzes alternative regulatory options. Wherever possible, the costs and benefits are expressed in monetary terms. The report is organized as follows:

- **Chapter 2, Need for the Regulation**, discusses the statutory requirement for the rule and the nature of the environmental problems caused by the presence of toxic pollutants in California waters that are regulated by the rule.

- **Chapter 3, Baseline for Estimating Benefits and Costs**, describes the baseline for analysis of the potential incremental benefits and costs of the rule.

- **Chapter 4, Analysis of Costs and Cost-Effectiveness**, describes the methodology for estimating potential costs and the results of the cost analysis.

- **Chapter 5, The Benefits Associated with the CTR: Methods and Concepts**, provides a discussion of concepts applicable to the analysis of benefits.

- **Chapter 6, Qualitative Assessment of Potential Ecological Benefits**, describes the types of ecological benefits anticipated to result from state implementation of the CTR.

- **Chapter 7, Benefits Methodology Issues: Contribution of Point Sources to Toxics-Related Water Quality Problems**, describes the method used to develop estimates of the potential contribution of point sources to toxic-related water quality problems.

- **Chapter 8, Quantified and Monetized Benefits Estimates**, presents the analysis of quantified and monetized benefits resulting from state implementation of the CTR.

- **Chapter 9, Comparison of Potential Benefits to Costs**, compares the potential benefits and costs estimated in the previous chapters.

- **Chapter 10** provides references.

- **Appendix A, Alternatives Analysis**, provides estimates of the potential cost and cost-effectiveness of two alternative regulatory options considered but not selected for the CTR: a less stringent human health risk level and applying toxic metals criteria in total recoverable form.

- **Appendix B, Compliance Cost Decision Matrix**, describes the assumptions EPA used to develop a forecast of how facilities may comply with limits established under the CTR.

- **Appendix C, Detailed Cost Estimates,** provides additional details on the estimated costs.

2.0 NEED FOR THE REGULATION

This chapter discusses the statutory authority for the CTR and the environmental factors that indicate a need for water quality criteria for toxic pollutants for California inland surface waters and enclosed bays and estuaries.

2.1 STATUTORY REQUIREMENT

Section 303(c)(2)(B) of the CWA requires states to adopt numeric water quality criteria for priority toxic pollutants for which EPA has issued Section 304(a) criteria guidance and whose presence could reasonably be expected to interfere with designated uses. Priority toxic pollutants are identified in Section 307(a) of the CWA. The CTR establishes numeric water quality criteria for priority toxic pollutants for the State of California that fulfill the requirements of Section 303(c)(2)(B).

EPA is promulgating this rule to fill a gap in California water quality standards. This gap resulted when the California Superior Court for the County of Sacramento ordered the SWRCB to rescind two statewide water quality control plans for inland surface waters and enclosed bays and estuaries. These plans contained water quality criteria for priority toxic pollutants for which EPA had issued CWA Section 304(a) criteria guidance. Thus, the State of California is currently without water quality criteria for many priority toxic pollutants as required by the CWA, necessitating this action by EPA.

When these federal criteria take effect, they will be the legally applicable water quality standards in the State of California for inland surface waters and enclosed bays and estuaries. The State will use these standards for all purposes and programs under the CWA. These criteria do not change or supersede any criteria previously promulgated for the State of California in the NTR, as amended (57 FR 60848, December 22, 1992, as amended by 60 FR 22228, May 4, 1995).

2.2 AN OVERVIEW OF ENVIRONMENTAL CONCERNS

The CTR addresses important environmental problems in California water bodies. Control of toxic pollutants in surface waters is necessary to achieve the CWA's goals and objectives. Many of California's monitored river miles, lake acres, and estuarine waters have elevated levels of toxic pollutants. Recent studies of California water bodies indicate that elevated levels of toxic pollutants exist in fish tissue; these discoveries have resulted in fishing advisories or bans.

Toxic pollutants covered by the CTR impair many of California's surface water resources. For this assessment, EPA has defined "impaired" waters as those that have been assessed and rated by the State of California as having medium or poor water quality for at least one toxic water quality pollutant or groups of pollutants. EPA has further defined "impaired" as meaning at least one designated use shows some degree of impairment. Information provided in this assessment, together with other data sources, indicates that toxic pollutants or groups of pollutants adversely

affect large areas of surface water in California and their associated beneficial uses. According to U.S. EPA (1997), major impacts include the following:

- Available data suggest that over 800,000 acres of assessed bays, estuaries, lakes, and wetlands may be impaired by one or more toxic pollutants, as are over 3,700 miles of rivers. Most notably, more than two-thirds of the assessed area of both bays and saline lakes may be adversely affected by toxic pollutants.

- Inorganic pollutants such as metals and trace elements (particularly selenium) are the most significant categories of toxic pollutants affecting the water quality in assessed waters statewide. Pesticides are also associated with large areas of water quality impairment.

- On the basis of the areal extent of contamination and the uses of affected water bodies, San Francisco Bay and the Central Valley appear to be the areas most influenced by toxic contamination. In addition, toxic pollutants are responsible for impaired water quality in a high percentage of river and saline lake areas in the Colorado River Basin. These areas constitute those most extensively affected by toxic pollutants, but waters in all regions of California show some degree of impairment by toxics.

- Both point and nonpoint sources play a role in contributing to toxic pollution. Agriculture, primarily agricultural drainage, is the most frequently cited source of pollutants that impair rivers and is also frequently cited as a contributor to impaired lakes and reservoirs. Urban runoff and other nonpoint sources (e.g., deposition, spills) are most frequently cited as contributing factors to water quality problems in toxics-impaired bays. Mining also is a frequently cited source (mining operations may or may not be a point source), particularly for lakes and reservoirs, and toxic pollutants discharged by municipal wastewater treatment plants contribute to the impairment of a variety of water body types, particularly estuaries and wetlands.

- Currently, there are 12 fish consumption health advisories in waters covered by the CTR (9 inland water bodies and 3 enclosed bays and estuaries) because of high levels of contamination in fish tissue by mercury, PCBs, chlordane, dioxin, DDT, pesticides, and selenium. The advisories range from avoiding consumption of all species to limiting consumption of a few species to several meals per month. In addition, the state has four waterfowl health warnings for consuming waterfowl taken from the Grasslands area, Suisun Bay, San Pablo Bay, and San Francisco Bay based on elevated selenium levels in duck, greater and lesser scaup, and scoters.

3.0 BASELINE FOR ESTIMATING BENEFITS AND COSTS

An analysis of the potential benefits and costs associated with implementing the CTR requires that a baseline be established. The baseline describes what would occur in the absence of a regulation and provides an initial starting point for measuring the incremental cost and benefit of regulatory compliance. This chapter describes the baseline EPA established for analyzing the potential costs and benefits anticipated under the CTR. It also discusses other sources of toxic pollutants, and thus potential benefits and costs relevant to the CTR, that EPA did not address in this analysis.

3.1 POINT SOURCE DISCHARGES

The CTR establishes criteria for all designated priority toxic pollutants, except those addressed in the NTR, for California inland surface waters and enclosed bays and estuaries. EPA analyzed the potential benefits and costs for point source discharges to comply with these criteria. To do this, EPA used a sample of facilities to represent the universe of all California point source dischargers. To establish baseline permit limits, effluent concentrations, and controls, EPA obtained the most recent NPDES permit and monitoring data available for point source dischargers. Sources of monitoring data included EPA's Permit Compliance System (PCS), hard-copy Discharge Monitoring Reports (DMRs), the nine Regional Water Quality Control Boards (RWQCBs), and the sample facilities. EPA used the most recent 3-year period of data available for each facility to evaluate the potential impact of the CTR.

3.1.1 Baseline Effluent Concentration

EPA established baseline effluent concentrations for pollutants determined to have a reasonable potential to exceed the projected CTR-based limit under two scenarios. For a low scenario, EPA considered only those pollutants that had been detected in the effluent during the past 3 years. EPA then used the maximum effluent concentration reported in the most recent 3 years of monitoring data as the baseline pollutant discharge concentration. However, if this value exceeded an existing permit limit for a given pollutant, EPA used the permit limit as the baseline discharge concentration.

As a high scenario, EPA established baseline effluent concentrations as being equal to existing permit limits, whether or not the pollutant had been detected in the effluent. This typically provides an upper bound on discharge concentrations because most facilities discharge at a level below their current limit. However, if there was no permit limit for a priority pollutant, the maximum effluent concentration was used as the baseline for those pollutants found to have reasonable potential to exceed the projected CTR-based limit based on effluent data.

Thus, the low scenario provides a more likely scenario of the pollutants for which reasonable potential would be determined because it is based on actual data indicating that the pollutants are present in the effluent. In comparison, the high scenario provides an upper bound on the

pollutants for which reasonable potential could exist. That is, pollutants are included in the high scenario analysis if the facility currently has an effluent limit for the pollutants even if there are no data to indicate that they are present in the effluent. There are many more pollutants considered in the high scenario than in the low scenario. One reason for this is that California's inland surface water plan (now rescinded) required permit limits to be established for all pollutants in the plan regardless of whether or not there was effluent data indicating their presence in the effluent. As a result, many facilities, including minor facilities, have limits for pollutants not detected in their effluent.

3.1.2 Baseline Pollutant Controls

EPA established the baseline for analysis of the pollutant controls necessary to meet projected CTR-based limits using the treatment systems in place at the sample facilities as described in the facility's NPDES permit. This baseline was used even in cases in which the existing maximum effluent concentration exceeded the existing permit limit at a facility. In theory, this assumption could result in overstating the pollutant controls necessary to meet the CTR-based limits if additional treatment were required to come into compliance with existing limits. However, in practice, only small differences were observed between current limits and maximum effluent concentrations.

3.2 WATER QUALITY

One of the most challenging analytic problems faced in estimating potential benefits attributable to implementation of the CTR is the need to account for the appropriate water quality baseline. A benefits analysis, for the most part, is able to measure improvements only from current or observable conditions. However, the appropriate baseline should account for water quality as it occurs assuming all current programs and legal requirements under the CWA, and other statutes or initiatives, are met. Therefore, there is an important distinction between current conditions and the conditions that reflect full implementation of existing programs.

An empirical approach to estimating the benefits relevant strictly to the CTR would be to estimate the reductions in toxic pollutant loadings from current conditions to the CTR-relevant baseline and then from this baseline to conditions following CTR implementation. EPA estimated pollutant loadings and reductions from the CTR-relevant baseline to conditions following implementation. These estimates indicate that the CTR may have a significant impact relative to loadings at its baseline. However, there is no empirical information with which to discern how this reduction compares to the difference between current conditions and conditions that reflect full implementation of existing programs.

Because EPA does not have information on water quality conditions under the CTR-relevant baseline, EPA established a water quality baseline using information on current conditions. EPA used several sources of information in this analysis, including California's Water Quality Assessment (WQA) database, a database developed and maintained by the SWRCB. The WQA database contains information on pollutants that adversely affect water quality in water bodies

that have been evaluated, the sources of these pollutants, the beneficial uses impaired, and a rating of water quality. The WQA used for this analysis was updated in 1994. This analysis is described in detail in U.S. EPA (1997); the results are summarized briefly in Chapter 2.

To identify the extent to which California waters are impaired by the toxic pollutants addressed by the CTR, EPA relied on the WQA ratings of good, medium, and poor. Good quality waters are defined in the WQA as waters that support and enhance designated beneficial uses. Medium quality waters are those that support designated beneficial uses with occasional degradation and include waters suspected to be poor where available data are inadequate to allow a definitive conclusion. Poor waters are those that cannot reasonably be expected to support designated beneficial uses. EPA defined impaired waters for this analysis as those that are rated medium or poor for one or more toxic pollutants addressed by the CTR [although, as described in U.S. EPA (1996), an exact matching of the WQA database to the pollutants addressed by the CTR was not possible].

Another source of baseline information is California's Toxic Substances Monitoring Program (TSMP). The TSMP monitors the occurrence of toxic pollutants in California's waters through sampling and analysis of fish tissue and contains freshwater tissue samples collected throughout the state. Fish tissue contaminant levels also were obtained from EPA's 1992 National Study of Chemical Residues in Fish and from a 1994 study by the San Francisco RWQCB, Contaminant Levels in Fish Tissue from San Francisco Bay. These sources also are described in detail in U.S. EPA (1996).

3.3 COSTS AND BENEFITS NOT ANALYZED

Although in this analysis EPA focused on estimating benefits and costs from controlling point source discharges from NPDES-permitted facilities, EPA believes that a comprehensive watershed approach that addresses all significant sources of problem pollutants may present a more cost-effective compliance approach and may be necessary to achieve water quality standards. However, the total costs of actions necessary to implement a watershed approach in a given area can be adequately estimated only after an in-depth site-specific study of the water body. Therefore, the total costs estimated in this analysis may not result in full attainment of water quality standards in all California water bodies. Accordingly, the benefits estimated here include only those that may occur as a result of loadings reductions from point sources typically subject to numeric water quality-based effluent limits (WQBELs).

The state may ask or require other sources to implement best management practices (BMPs) or to participate in a comprehensive watershed management planning approach. Control strategies for wet weather discharges and nonpoint sources are an important piece of EPA and California's current overall strategy to improve water quality. Many of the programs developed to control wet-weather discharges and nonpoint sources are already in place. Costs due to these programs already have been incurred or will soon be incurred owing to existing federal, state, and local environmental programs. The categories of nonpoint sources and wet weather discharges that are likely to contribute to toxic impairment of water bodies, yet are not always subject to numeric

effluent limits, are described below. Programs to control these types of pollution that need to continue if all California waters are to ultimately meet water quality standards also are described.

3.3.1 Agricultural Runoff

Agriculture is one of the largest sources of pollutants in California. Toxic water quality problems result from the application of fertilizers and pesticides and from the discharge of used irrigation water. Pesticides and fertilizers are carried into water bodies via rain and soil erosion. Irrigation water must be drained from fields resulting in the discharge of pesticides, selenium, metals, and other trace contaminants. This irrigation drainage must be transported to holding ponds, evaporation ponds, local water bodies, or reintroduced to the local irrigation system.

As a result of existing federal and state laws, much research and time has been spent attempting to alleviate the difficult problems caused by agricultural runoff. Unlike most point source discharges, polluted runoff from agricultural lands cannot be effectively diminished by treatment systems. Instead, controls focus on reduction in the use of pesticides and changes in the use of water and land. Improvements in irrigation techniques and the reuse of drainage water on salt-tolerant plants can reduce the amount of polluted drainage. Retirement of agricultural lands that have high levels of salts is another alternative to reducing polluted drainage.

3.3.2 Inactive and Abandoned Mines

California has more than 15,000 inactive, abandoned mines. Only six major NPDES permits have been issued for mine discharges. Although 27 additional mines have been issued minor NPDES permits, the vast number of inactive and abandoned mines is not currently permitted. Acid mine drainage results in the discharge of metals such as cadmium, copper, lead, mercury, and zinc.

Technologies used to control mine discharge include prevention and treatment. Prevention may include diversion of local streams away from reactive material, covering reactive mine waste, mixing reactive waste with limestone to buffer acid, disposing of reactive mine waste underwater to eliminate reaction with air, impounding mine drainage to keep it from entering surface waters, and sealing the mine portal to flood the mine, which suppresses the formation of acid mine drainage. Treatment methods vary depending on the site and extent of pollution and involve control of the mine drainage before it enters surface waters. Treatment techniques include chemical precipitation, ion exchange, construction of wetlands, and evaporation of mine discharge in surface impoundments (California State Water Resources Control Board, 1995).

Efforts are already under way to clean up some mine sites under existing state and CWA requirements (storm water regulations) and Superfund [the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)]. However, in order to reach full compliance with water quality standards, additional assessment and treatment may be necessary for some California water bodies.

3.3.3 Urban Runoff

Urban runoff in California has been shown to be a significant contributor to water quality problems. Urban runoff is currently regulated as an NPDES point source for large towns and as a nonpoint source for medium and small towns. Most cities in California have separate systems for wastewater, which handle normal used water flows, and storm drainage, which divert storm water to prevent flooding. When rainfall picks up pollutants, such as toxic metals and pesticides that accumulate on the ground, storm water drains can carry harmful amounts of these pollutants into rivers, lakes, and bays.

Programs designed to control storm water pollution stress BMPs and also often emphasize pollution prevention (e.g., street cleaning or the reduction in use of pesticides and fertilizers) and public education. Public outreach is designed to address proper use, storage, and disposal of household chemicals, pesticides, oil, and other wastes. Efforts to control urban runoff through BMPs are also under way through both NPDES storm water permits and through nonpoint source planning. For example, under its existing NPDES storm water permit, the cities and counties of the Los Angeles area plan to spend $15 million annually on public education and a program to curb illegal dumping (California State Water Resources Control Board, 1996).

Since some of the sources discussed above are exempt from federal permitting requirements, the State of California must develop alternative strategies and controls to protect or restore water quality that is affected by these sources. The State of California established three general management approaches to address nonpoint source problems in its 1988 Nonpoint Source Management Plan, including voluntary implementation of BMPs, regulatory-based encouragement of BMPs, and waste discharge limitations. In most cases, the RWQCBs decide the mix of options that will be used to address any given nonpoint control problem.

4.0 ANALYSIS OF COSTS AND COST-EFFECTIVENESS

This chapter presents the analysis of the potential costs resulting from implementing the CTR. The method used to calculate costs is generally the same as that presented in SAIC (1997). However, EPA made some changes to the sample and the methodology in response to comments and to improve the analysis. The methodology is described in Section 4.1. Changes to the analysis since proposal of the draft CTR are explained in Section 4.2. The results of the analysis, including costs, pollutant loading reductions, and cost-effectiveness by discharger category, are presented in Section 4.3. Section 4.4 summarizes the sources of uncertainty in the cost analysis.

4.1 METHODOLOGY

As described in SAIC (1997), to estimate potential costs and pollutant loading reductions attributable to implementation of the proposed CTR, and for the final CTR, EPA developed detailed estimates for a sample of point source dischargers to California's inland waters and enclosed bays and estuaries, and then extrapolated these results to the universe of potentially affected facilities. The population of NPDES-permitted facilities that discharge into inland surface waters and enclosed bays and estuaries in California includes 184 major dischargers and 1,057 minor dischargers. EPA selected 16 major dischargers and 11 minor dischargers to represent the various discharger categories and geographic distribution of the universe of facilities.

EPA then estimated the potential impact of the CTR on these sample facilities, as described below. The impact of the CTR will vary depending upon the procedures that will be used to implement the criteria. These procedures typically specify the methods for assessing the need for WQBELs and, if WQBELs are required, the method for deriving WQBELs from applicable water quality criteria. For this analysis, EPA derived WQBELs using implementation procedures based on the methods recommended in the Technical Support Document for Water Quality-based Toxics Control (TSD) (U.S. EPA, 1991).

4.1.1 Method for Determining Reasonable Potential to Exceed CTR Water Quality Criteria

The NPDES permit regulations in 40 CFR 122.44(d) and 123.25 require that WQBELs be derived for toxic pollutants that are discharged at a level that has a reasonable potential to cause or contribute to an exceedance of water quality standards. To determine whether there is reasonable potential with respect to projected CTR-based limits, EPA followed several conventions. First, for those toxic pollutants for which limits are already established in a facility's current permit, EPA assumed that a reasonable potential existed. Second, for those pollutants with no limit in the existing permit but that were detected in the effluent (as reported in the permit application or as a result of monitoring conditions contained in the NPDES permit), EPA determined reasonable potential using the method recommended in EPA's TSD, described below. Finally, if all monitoring data for a facility were reported as below analytical detection

levels, even if the reported detection limit was above EPA-approved analytical method detection levels, EPA assumed that no reasonable potential existed to exceed CTR-based WQBELs.

Where data indicated that a pollutant was present, but no current permit limit had been developed, EPA calculated the projected effluent quality (PEQ) and compared it to projected CTR-based WQBELs for all pollutants of concern. A PEQ is an estimate of the maximum effluent pollutant concentration that is derived from actual measured values taking into account statistical uncertainty. EPA calculated a projected CTR-based WQBEL using all applicable CTR criteria (based on protection of aquatic life and human health) and compared the PEQ to the most stringent of the calculated CTR-based WQBELs. If the PEQ exceeded the projected CTR-based WQBELs, EPA concluded that there is reasonable potential to exceed a CTR-based WQBEL. Pollutants for which EPA determined reasonable potential existed were then analyzed to determine potential controls necessary to achieve the CTR-based WQBEL.

4.1.2 Method for Estimating Potential Costs

Where reasonable potential was determined for a pollutant at a facility, EPA calculated a projected CTR-based WQBEL in accordance with the TSD procedures. If the existing NPDES limit was more stringent than the CTR-based limit, then no cost or load reductions were assigned to the facility. However, if the CTR-based limit was more stringent than the existing NPDES permit limit, or, in the absence of an existing limit, if the CTR-based limit was more stringent than the maximum observed effluent concentration, EPA estimated a cost that the facility would likely incur to meet the more stringent limit.

To estimate costs, EPA performed an engineering analysis of how each sample facility could comply with the projected CTR-based effluent limits. The costs to meet the projected CTR-based limit were performed under two different costing scenarios using a "compliance cost-decision matrix," developed to predict how a facility would likely achieve the requisite pollutant reduction. EPA developed this matrix to ensure consistency in estimating the general types of controls that would be necessary to comply with the CTR's more stringent requirements, as well as to integrate other alternatives into the cost analysis. The matrix establishes specific rules to provide reviewing engineers with guidance in consistently selecting options. This matrix is presented in Appendix B.

Under the decision matrix, EPA first considered costs for relatively minor treatment plant operation and facility changes. EPA considered minor, low-cost modifications or adjustments of existing treatment feasible if the literature indicated that the existing treatment process could achieve the revised WQBEL and if the additional pollutant reduction was relatively small (e.g., 10% to 25% of current discharge levels).

When it was not technically feasible to simply adjust existing operations, EPA considered a control strategy of waste minimization/pollution prevention. However, EPA estimated costs for these controls only when they were considered feasible based on the reviewing engineer's understanding of the treatment processes at a facility. The decision matrix established several

rules of thumb for this determination. These rules considered the level of pollutant reduction achievable through waste minimization/pollution prevention techniques, the appropriateness of waste minimization/pollution prevention for the specific pollutant, and knowledge of the manufacturing processes generating the pollutant of concern. In general, detailed treatment and manufacturing process information was not available in NPDES permit files; therefore, the assessment of feasibility was based primarily upon the reviewing engineer's best professional judgment using general knowledge of industrial and municipal operations.

If EPA determined that waste minimization/pollution prevention alone was not feasible to reduce pollutant levels to those needed to comply with the projected CTR-based WQBELs, EPA estimated costs for a combination of waste minimization/pollution prevention, simple treatment, and/or process optimization. If these relatively low-cost controls could not achieve the CTR-based WQBELs, EPA estimated costs for more expensive controls (e.g., end-of-pipe treatment).

Development of end-of-pipe treatment cost estimates began with a review of the existing treatment systems at each facility. EPA considered its Office of Research and Development, Risk Reduction Engineering Laboratory's "RREL Treatability Database" (Version 4.0) in determining the need for additional or supplemental treatment. The pollutant removal capabilities of the existing treatment systems and/or any proposed additional or supplemental systems were evaluated based on the following criteria: (1) the effluent levels that were being achieved currently at the facility; and (2) the levels that are documented in the EPA "RREL Treatability Database." If this analysis showed that additional treatment was needed, EPA estimated capital and operating and maintenance (O&M) costs for unit processes that would achieve compliance with the projected CTR-based effluent limits using the same documentation.

Finally, for a low cost scenario (described below), EPA considered the relationship between the cost of adding the treatment and other types of remedies or controls following the calculation of end-of-pipe treatment costs. Specifically, if the estimated annualized cost for removing a pollutant exceeded a prescribed value [expressed as dollars per pound equivalent ($/lb-eq)] for a facility, EPA assumed that a discharger would use alternative regulatory approaches to comply with CTR-based effluent limits as long as the cost of these options was less than the anticipated pollution control costs. EPA referred to the prescribed value as the "cost trigger." In these situations (this was the case for two pollutants at one sample facility), EPA estimated the cost for special studies or monitoring that may be required to pursue the regulatory alternative instead of treatment costs and did not anticipate pollutant loading reductions at the facility.

The types of alternative regulatory approaches assumed available for dischargers in California include phased total maximum daily loads (TMDLs), water quality standard variances, site-specific criteria, change in designated use, translators for metals, and alternative mixing zones. Whether these options are available to dischargers or not depends on how the State chooses to implement the CTR. EPA accounted for the potential use of such alternatives by employing the cost trigger as part of a low cost scenario. However, to ensure that costs are not underestimated if these alternatives are not available, EPA developed a high cost scenario that does not employ the cost trigger. If the State does not make alternative regulatory approaches available to

dischargers, EPA believes that the potential cost impact will lie between the low and high scenario estimates.

Cost Scenarios

Since states are not required to use the methods recommended in the TSD, implementation procedures can vary, and may result in more or less stringent WQBELs. Because of the uncertainty regarding the State of California approach to implementation at this time, EPA developed a range of costs to represent the potential range of impact of the CTR based on certain implementation assumptions. The upper and lower bounds of these cost assumptions are referred to as the "high" and "low" cost scenarios, respectively. The principal differences between these scenarios are described below.

EPA established the baseline for analysis of the pollutant controls necessary to meet projected CTR-based limits using the treatment systems in place at the sample facilities as described in the facility's NPDES permit. This baseline was used even in cases in which the existing maximum effluent concentration exceeded the existing permit limit at a facility. In theory, this assumption could result in overstating the pollutant controls necessary to meet the CTR-based limits if additional treatment were required to come into compliance with existing limits. However, in practice, only small differences were observed between current limits and maximum effluent concentrations in these cases.

Low Scenario

For a low scenario, EPA calculated baseline loadings and CTR-based WQBELs and loadings only for those pollutants that had been detected in the effluent at sample facilities for the most recent 3 years of data since 1993 and that failed the reasonable potential test.

EPA developed a low cost scenario to reflect a lower baseline loadings estimate and a more flexible State implementation approach than the high scenario. The assumptions used for the low scenario result in an estimate based on a smaller number of affected pollutants and a lower amount of incremental pollutant removals necessary to comply with CTR-based effluent limits (as compared with the high scenario). The assumptions used for the low scenario are:

- In the absence of any monitoring data, EPA assumed that no costs would be incurred, even if a permit limit exists that is less stringent than the CTR-based limit. That is, EPA assumed that if a facility is not monitoring for a pollutant, it is not likely to be present in the effluent.

- As described more fully above, if the estimated annualized cost for removal of a pollutant exceeded a cost trigger of $200 per toxic pound-equivalent, EPA assumed that dischargers would use alternative regulatory approaches (as long as the cost of such options was less than the cost of pollution control). In these situations, EPA estimated the cost for alternative approaches and did not

anticipate any pollutant loading reductions.

High Scenario

For a high scenario, EPA established baseline loadings and calculated projected CTR-based WQBELs and loadings for all pollutants for which limits had been established in existing NPDES permits (whether or not data indicated that these pollutants were present in the discharge). EPA also established baseline loadings and calculated projected CTR-based WQBELs and loadings for all other CTR regulated pollutants that were detected in the effluent and failed the reasonable potential test.

EPA developed the high cost scenario to reflect a higher baseline loadings estimate and a less-flexible state implementation approach than the low scenario. The assumptions used for the high scenario result in an estimate with a greater number of affected pollutants and a greater amount of incremental pollutant removals necessary to comply with CTR-based effluent limits compared to the low scenario. In addition, all necessary pollutant reductions were assumed to be achieved through either treatment or a waste control program (e.g., waste minimization, pollution prevention). That is, EPA did not employ the cost trigger for the high scenario.

Extrapolation of Costs

After estimating potential capital and O&M costs for each facility under the two scenarios, EPA estimated total annual costs by annualizing capital costs 7% over ten years and then adding in O&M costs. Note that this assumed ten year capital life likely overstates costs because capital equipment may last considerably longer than ten years.

EPA then extrapolated the annual costs based on the percent of the universe of regulated facilities represented by each group of sample facilities. EPA extrapolated major POTWs using three flow strata. EPA extrapolated major industrial facilities using industrial classification groupings (e.g., lumber and paper, electric utilities). Finally, EPA extrapolated minor POTWs and minor industrial facilities as separate groupings (not further distinguished by flow or industrial category).

4.1.3 Method for Estimating Pollutant Loading Reductions

EPA calculated pollutant loading reductions for each facility by calculating the difference between the baseline effluent concentration and the projected CTR-based effluent limitation.

For the low scenario the following apply:

- No reduction was assumed if the difference between the baseline value and the CTR limitation was negative.

- If the existing effluent concentration was above the MDL, but the CTR-based

limit was below the MDL, the CTR-based limit, or one-half of the MDL (whichever produces a smaller load reduction) was used for the CTR-based effluent limitation.

- If the maximum reported effluent concentration exceeded the existing permit limit, high scenario assumptions were employed.

For the high scenario the following apply:

- If all effluent data for a pollutant were reported below detection levels, the method detection level (MDL) was used as the maximum observed concentration. If the maximum observed concentration was below the CTR-based limitation, no loading reductions were considered.

- If the difference between the baseline value (existing permit limit or effluent concentration) and the CTR limitation was negative, zero reduction was assumed.

- If both the CTR-based WQBEL and the existing permit limit were below the analytical MDL, one-half of the difference between the existing permit limit and the CTR-based limit was used to estimate the pollutant load reduction.

- If the existing permit limit (or effluent concentration in the absence of a permit limit) was above the MDL, but the CTR limit was below the MDL, the CTR-based limit, or one-half of the MDL (whichever produced a smaller load reduction) was used for the CTR-based limit for calculating pollutant load reductions.

EPA estimated annual baseline pollutant loadings by multiplying the baseline value (expressed in micrograms per liter) by the average daily flow rate (in million gallons per day), or, for publicly owned treatment works (POTWs), by the design flow, a conversion factor (0.00834), and 365 days per year. Then, to determine the reduction in loadings, EPA converted the difference between the most stringent existing permit limitation (or the maximum reported effluent concentration) and the most stringent CTR-based effluent limitation (in concentration units) to pounds per year by multiplying the difference by the facility's average daily flow rate (design flow rate for municipal dischargers), a conversion factor, and 365 days per year. EPA calculated annual pollutant loading reductions for each of the pollutants analyzed at each sample facility for which costs were estimated. The average load reduction then was calculated across sample facilities within each discharge category and extrapolated to the universe of facilities by multiplying the average load reduction by the total number of facilities in the category (EPA extrapolated facility specific costs similarly).

EPA converted baseline pollutant loadings and loading reductions from actual pounds (lb) to toxic-weighted pounds-equivalent (lb-eq) using EPA chronic freshwater aquatic life criteria and toxicity values, standardized to the former chronic aquatic life criterion for copper (copper

formerly had a water quality criterion value of 5.6 ug/L). EPA human health criteria also were used in cases in which a human health criterion had been established for the consumption of fish. National water quality criteria have changed over the years, resulting in corresponding changes in toxic weights. Also, because the CTR applies to both freshwater and saltwater, two different sets of toxic weights would be required. To prevent the overstating of pollutant reductions due to the higher toxic weighting factors that would have been calculated using CTR criteria, EPA used previously calculated toxic weights shown in **Exhibit 4-1**. This approach allows for the direct comparison of the loadings reductions predicted from implementation of the CTR criteria and those loading reductions predicted in previous EPA rulemakings.

4.1.4 Method for Estimating Costs to Indirect Dischargers

Because of the uncertainty of the exact controls that POTWs would use as a result of more stringent CTR-based WQBELs, EPA assumed that many POTWs will select the option of controlling discharges to their collection system as a cost-effective means to comply with CTR-based permit limits. If POTWs were to select this method of control, the dischargers to the POTWs would be affected. Therefore, EPA estimated the potential costs to dischargers to POTWs (i.e., indirect dischargers).

EPA's estimate was based in part on information from the San Jose-Santa Clara and Sunnyvale POTWs, which discharge to South San Francisco Bay, and which already have conducted substantial work with indirect dischargers to meet current permit limits. Specifically, these POTWs were required to perform mass audit studies for copper and nickel. These studies estimated the total costs of implementing various combinations of copper and nickel reduction projects (see City of San Jose, 1994; EOA, 1994). Based on these studies, EPA estimated an average cost per significant industrial users (SIU) of $64,395, or $15,705 per year annualized at 7% over a period of 5 years. EPA then multiplied this cost by the percentage of SIUs assumed to be affected under the low and high scenarios (see Section 4.2).

Exhibit 4-1. Toxic Weights of Pollutants Analyzed

Pollutant	Toxic Weight
Antimony *	1
Arsenic	4
Cadmium	5.2
Chromium VI	35.5
Copper	0.47
Lead	1.8
Mercury	500
Nickel	0.036
Selenium	1.1
Silver	47
Thallium*	1
Zinc	0.051
1,2-Dichlorobenzene	0.011
1,2 Dichloroethane*	1
1,2 Dichloropropane*	1
1,2-Trans-Dichloroethylene*	1
1,3-Dichlorobenzene*	1
1,3-Dichloropropylene*	1
1,4-Dichlorobenzene*	1
2,4-Dinitrophenol*	1
2,4,6-Trichlorophenol	0.35
4,4'-DDD	760
4,4'-DDT	6,500
Aldrin	50
alpha-BHC	100
alpha-Endosulfan	100
Benzene	0.018
Benzo (a) Anthracene*	1
Benzo (a) Fluoranthene*	1
Benzo (k) Fluoranthene*	1
beta-BHC	100
beta-Endosulfan*	1
Bromoform*	1
Butylbenzyl-phthalate*	1
Carbon Tetrachloride*	1
Chlordane	2,300
Chlorobenzene*	1
Chlorodibromomethane*	1
Chloroform	0.0021
Dichlorobromomethane*	1
Dieldrin	57,000

Source: EPA/OST 1988 Cost-Effectiveness Criteria and Weights.
*Value was not provided in source document. A toxic weight of 1 was assumed.

4.2 SUMMARY OF CHANGES TO DRAFT ANALYSIS

To address comments raised on the draft economic analysis (SAIC, 1997), EPA gathered additional data and information to refine the analysis of potential costs and pollutant loading reductions attributable to the CTR. A large part of the effort was directed toward obtaining the most recent NPDES permits and effluent monitoring data for the sample facilities. Efforts also were directed toward increasing the sample size of minor POTWs and minor industrial facilities. EPA randomly selected four new minor POTWs and five new minor industrial facilities to add to the sample. The number of sample facilities selected in each RWQCB was roughly proportional to the universe of facilities in the region. The new sample facilities are listed in **Exhibit 4-2.**

Exhibit 4-2. New Minor Sample Facilities

POTWs	Industrial Facilities
Forestville County Sanitation District	Airline Signal Aerospace, Torrance Facility
City of Calistoga	Los Angeles County Department of Parks and Recreation, Lennox County Park
City of Biggs	Sierra Pacific Feather River Division, Mill Creek
Donner Summit Public Utility District Wastewater Treatment Plant	Great Lakes Chemical Corporation
	California Department of Fish and Game, Iron Gate Salmon Hatchery

An original minor industrial facility (Arco Station 434) was deleted from the sample, however, because it ceased operation and no effluent monitoring data were available for the analysis. As a result of the addition of the facilities listed in Exhibit 4-2, the final sample size of minor POTWs was five, and the final sample size of minor industrial facilities was six.

For the major facility sample, EPA randomly selected the San Diego Gas and Electric Facility at South Bay to replace the San Diego Gas and Electric Silvergate Facility. The Silvergate facility is no longer in operation and no effluent monitoring data were available for the analysis. Additionally, EPA removed the Mining Remedial Recovery Company (known as Alta Gold in the original sample) from the sample. The facility is a closed mine with acid mine drainage coming out of many adits disseminated around the property.

EPA also revised its methodology for calculating a PEQ to address mathematical problems encountered due to limited data sets for some facilities. In the original cost estimate, all non-detect values were assumed to be "zero" for the purposes of calculating the coefficient of variation (CV). This approach resulted in unrealistically high CV values in some instances. A high CV value results in the selection of a high PEQ multiplier and, consequently, a high PEQ value. Based on a review of the available data, EPA determined that using one-half of the method detection level, instead of "zero" for non-detects, resulted in a more accurate CV. EPA, therefore, revised the PEQ methodology to use the following:

- For calculation of the CV, half the detection level of the sample was used for effluent data reported as below the detection level.

- If greater than 20 data points were available for a pollutant, the 99th percentile value was calculated from the data set to represent the PEQ.

Changes to the cost estimation methodology included revisions to the treatment process optimization costs and waste minimization/pollution prevention cost estimates. EPA developed process optimization cost estimates to replace the previous average per facility cost of $100,000. Process modification costs are expressed as a range of values and are based on the flow and type of treatment system [e.g., $2,000 to $60,000 for optimization of biological treatment at a less than one million gallons per day (MGD) facility].

For waste minimization/pollution prevention, EPA increased the cost used in the high scenario for POTWs with a design flow of greater than 5 MGD (from $400,000 to $2,000,000). The revised cost is the highest pollution prevention cost estimate derived by EPA in assessing of compliance costs resulting from implementation of the proposed Great Lakes Water Quality Guidance (SAIC, 1993). The revised cost estimates are shown in **Exhibit 4-3.**

Exhibit 4-3. Revised Waste Minimization/Pollution Prevention Cost Estimates

Category	Low Scenario	High Scenario
POTWs with flow greater than 5 MGD	$400,000	$2,000,000
POTWs with flow less than 5 MGD	$400,000	$400,000
Minor POTWs	$50,000	$50,000
Minor Industrial Dischargers	$50,000	$50,000

Previously, when costs exceeded $500 per pounds-equivalent (lb-eq) removed for an industrial category in the high scenario, EPA assumed that regulatory alternatives to treatment would be used. For this revised analysis, the high scenario reflects the assumption that no regulatory alternatives will be available to dischargers. EPA still assumes that regulatory alternatives will be pursued under the low scenario when the cost for an individual facility exceeds $200 per lb-eq removed.

EPA also revised its assumptions regarding the number of indirect dischargers that may be affected as a result of more stringent CTR-based WQBELs at POTWs. EPA estimated that there are 2,144 SIUs that discharge to POTWs located on California inland surface waters and enclosed bays and estuaries. Previously, EPA assumed that 10% to 30% of SIUs would be impacted. Based on comments received indicating that the number of facilities affected was understated, EPA increased this range to 30% to 70%. However, EPA believes that this revised assumption is unrealistic and that the original 10% to 30% more closely reflects the likely impact. Nonetheless, EPA increased the range of affected facilities to ensure that the cost

estimates for the final rule account are conservative (i.e., err on the side of higher costs).

EPA applied the 70% estimate under the low cost scenario which reflects less use of end-of-pipe treatment and more use of source controls. EPA applied the 30% estimate under the high scenario which reflects more frequent use of end-of-pipe treatment. EPA estimated costs to indirect dischargers based on the average costs from the mass audit studies conducted by San Jose and Sunnyvale, described above (see City of San Jose, 1994; EOA, 1994). Based on these studies, EPA estimated an average cost per indirect discharger of $64,395, or $15,705 per year annualized at 7% over a period of 5 years.

4.3 RESULTS

EPA estimated the potential annual cost of implementing the CTR ranges from approximately $33.5 million to $61.0 million. As shown in **Exhibit 4-4**, indirect dischargers bear most of these costs in the low scenario. Under the high scenario, direct dischargers were expected to incur most of the potential costs. However, high costs are unlikely because EPA used conservative (i.e., tending to err on the high side) assumptions in calculating CTR-based permit limits and in establishing baseline loadings. For example, the baseline loadings for the high scenario were generally based on current effluent limits rather than actual pollutant discharge data. Most facilities discharge pollutants in concentrations below current effluent limits.

Exhibit 4-4. Summary of Potential Annualized Costs (Millions of 1998 First Quarter Dollars)

Discharger Category	Low Scenario	High Scenario
Direct Dischargers	$9.9	$50.9
Indirect Dischargers	$23.6	$10.1
Total	**$33.5**	**$61.0**

4.3.1 Low Scenario

Under the low scenario, major permitted dischargers account for the largest share of the costs (91%) compared to 9% for minor dischargers. Of the major dischargers, POTWs are expected to incur the largest share (87%) of the projected costs (see **Exhibit 4-5**). However, distributed among 128 major POTWs in the state, the average cost per plant is approximately $61,000 per year. Chemical and petroleum industries incur the highest cost of the industrial categories (5.6% of the total annual costs, with an annual average of $25,200 per plant). For minor dischargers, only POTWs are expected to incur costs (9%). The average cost per plant for minor POTWs is approximately $5,000, an amount lower than any major facility category.

Nearly 38% of the total compliance costs are for pursuing alternative regulatory approaches. EPA assumed that alternative regulatory approaches would be pursued if the total cost of treatment exceeded a trigger of $200 per pound of pollutant reduced. Annualized costs for developing and implementing waste minimization plans accounted for 57% of the remaining costs. Five pollutants (copper, mercury, tetrachloroethylene, carbon tetrachloride, and methylene chloride) account for 53% of low scenario annual costs. Fifty-five percent of annual costs were for the control of toxic organics; costs to control metals and mercury accounted for 45% of all annual costs.

Exhibit 4-5. Summary of Annual Costs by Discharger Category: Low Scenario (1998 First Quarter Dollars)

Discharger Category	Number of Plants	Total Costs	Category Cost as a Percent of Total Cost	Average Cost per Plant
Major Dischargers				
POTWs	128	$7,841,583	87.0%	$61,262
Chemicals/Petroleum Products	20	$504,016	5.6%	$25,201
Electric Utilities	13	$370,182	4.1%	$28,476
Metals and Transportation Equipment	7	$52,822	0.6%	$7,546
Miscellaneous	12	$240,171	2.7%	$20,014
Lumber and Paper	4	$0	0.0%	$0
Subtotal	**184**	**$9,008,774**	**100%**	**$48,961**
Minor Dischargers				
POTWs	185	$921,894	100%	$4,983
Industrials	872	$0	0.0%	$0
Subtotal	**1057**	**$921,894**	**100%**	**$872**
All Dischargers				
Total	**1241**	**$9,930,668**	**NA**	**$8,002**

4.3.2 High Scenario

Under the high scenario, major permitted dischargers account for 94% of the annual costs compared to 6% for minor sample facilities. For major dischargers, POTWs were expected to incur approximately 87% of the total projected annualized cost (see **Exhibit 4-6**). However, distributed among the 128 major POTWs in the state, the average cost per plant is approximately $325,000 per year. Chemical and petroleum industries incur the highest cost among the industrial categories (9% of the total estimated annual cost, and averaging just over $221,000 per plant annually). For minor facilities, the average cost per plant for POTWs is $7,800, compared to $1,600 per plant for industrial facilities.

Over 91% of the annual costs are for waste minimization and treatment process optimization costs. Waste minimization represents nearly 84% of the total annual costs. EPA assumed that waste minimization and process optimization would be pursued because the increment of pollutant removal is relatively small (i.e., less than 25% of current effluent levels) and many of the sample facilities already possess treatment processes that could be enhanced to achieve CTR-based effluent limits. Capital and operating and maintenance (O&M) costs make up less than 9% of total annual costs. Four pollutants (tetrachloroethylene, silver, copper, and mercury) resulted in 41% of the estimated high scenario annual costs. Costs to control metals and mercury accounted for more than 50% of annual costs; costs to control toxic organic pollutants accounted for slightly less than 50%.

Exhibit 4-6. Summary of Annual Costs by Discharger Category: High Scenario (1998 First Quarter Dollars)

Discharger Category	Number of Plants	Total Costs	Category Cost as a Percent of Total Cost	Average Cost per Plant
Major Dischargers				
POTWs	128	$41,599,147	86.5%	$324,993
Chemicals/Petroleum Products	20	$4,425,287	9.2%	$221,264
Electric Utilities	13	$370,182	0.8%	$28,476
Metals and Transportation Equipment	7	$351,815	0.7%	$50,259
Miscellaneous	12	$1,321,720	2.7%	$110,143
Lumber and Paper	4	$0	0.0%	$0
Subtotal	**184**	**$48,068,151**	**100%**	**$261,240**
Minor Dischargers				
POTWs	185	$1,448,691	51.1%	$7,831
Industrials	872	$1,386,377	48.9%	$1,590
Subtotal	**1057**	**$2,835,068**	**100%**	**$2,682**
All Dischargers				
Total	**1241**	**$50,903,219**	**NA**	**$41,018**

Note: Totals may not add up due to rounding.

4.4 POLLUTANT LOADING REDUCTIONS AND COST-EFFECTIVENESS

Exhibits 4-7 and **4-8** present the annual unweighted and toxic-weighted baseline pollutant loadings and loadings reductions, respectively. As shown in Exhibit 4-8, under the low scenario, where the baseline represents existing effluent concentrations, the expected reduction in pollutant loadings resulting from implementation of the criteria contained in the CTR is approximately 1.1 million toxic lb-eq per year, or 50% of the baseline load of 2.2 million toxic lb-eq per year. Under the high scenario, the expected reduction in pollutant loadings resulting from the implementation of the CTR-based WQBELs is approximately 2.7 million toxic lb-eq per year, or 15% of the baseline load of 18.5 million toxic lb-eq per year.

Exhibit 4-7. Baseline Pollutant Loadings and Reductions (Not Toxicity-Weighted, Lbs/yr)

Pollutant	Low			High		
	Existing	Reduction	% Reduction	Existing	Reduction	% Reduction
Antimony (Sb)	0	0		0	0	
Arsenic (As)	148	0	0.0%	319,804	0	0.0%
Cadmium (Cd)	82	0	0.0%	45,764	225	0.5%
Chromium VI (Cr-VI)	1,759	1,327	75.4%	102,848	14,167	13.8%
Copper (Cu)	386,839	44,675	11.5%	451,966	82,241	18.2%
Lead (Pb)	311,631	23,268	7.5%	454,881	36,765	8.1%
Mercury (Hg)	2,116	1,583	74.8%	2,477	1,627	65.7%
Nickel (Ni)	294,259	0	0.0%	1,509,107	277,120	18.4%
Selenium (Se)	152	0	0.2%	57,256	54	0.1%
Silver (Ag)	3,679	2,252	61.2%	103,751	16,479	15.9%
Thallium (Tl)	0	0		0	0	
Zinc (Zn)	468,416	0	0.0%	1,468,700	71,476	4.9%
1,2 Dichlorobenzene	0	0		14,319,172	421,101	2.9%
1,2 Dichloroethane	0	0		2	0	0.0%
1,2 Dichloropropane	0	0		2	0	0.0%
1,2-Trans-Dichloroethylene	0	0		0	0	
1,3 Dichlorobenzene	0	0		4,425,512	0	0.0%
1,3-Dichloropropylene	0	0		0	0	
1,4 Dichlorobenzene	0	0		163,541	0	0.0%
2,4-Dinitrophenol	0	0		0	0	
2,4,6 Trichlorophenol	879	756	86.0%	1,876	756	40.3%
4,4'-DDD	0	0		0	0	
4,4'-DDT	1	0	0.0%	1	0	0.0%
Aldrin	0	0	0.0%	0	0	0.0%
alpha-BHC	9	0	0.0%	27	0	0.0%
alpha-Endosulfan	0	0		5	0	0.0%
Benzene	0	0		41,957	0	0.0%
Benzo (a) Anthracene	1	0	0.0%	1	0	0.0%
Benzo (a) Fluoranthene	1	0	0.0%	1	0	0.0%
Benzo (k) Fluoranthene	17	0	0.0%	17	0	0.0%
beta-BHC	34	0	0.0%	96	0	0.0%
beta-Endosulfan	0	0		4	0	0.0%
Bromoform	0	0		924	0	0.0%
Butylbenzyl-phthalate	0	0		0	0	
Carbon Tetrachloride	5,586	3,502	62.7%	5,598	3,508	62.7%
Chlordane	0	0		0	0	0.0%
Chlorobenzene	0	0		0	0	
Chlorodibromomethane	12,532	10,296	82.2%	12,533	10,296	82.2%
Chloroform	250,555	223,085	89.0%	1,336,084	522,958	39.1%
Dichlorobromomethane	57,456	54,669	95.1%	57,786	54,679	94.6%
Dieldrin	0	0	0.0%	0	0	0.0%
Di-n-Butyl Phthalate	0	0		0	0	
Endosulfan Sulfate	0	0		0	0	
Endrin	0	0		6	0	0.0%
Endrin Aldehyde	0	0		0	0	
Fluoranthene	0	0		186,752	0	0.0%
Fluorene	0	0		0	0	
gamma-BHC	130	41	31.2%	213	41	19.1%
Heptachlor	0	0	0.0%	0	0	0.0%
Heptachlor epoxide	0	0	0.0%	0	0	0.0%
Hexachlorobenzene	0	0		291	280	96.1%
Methylene chloride	16,885	5,253	31.1%	1,453,701	5,253	0.4%
PCBs	0	0		0	0	51.9%
Pentachlorophenol	879	773	88.0%	11,583	5,510	47.6%
Phenol	0	0		767,755	0	0.0%
TCDD	0	0		0	0	0.0%
Tetrachloroethylene	6,832	4,487	65.7%	6,930	4,492	64.8%
Toluene	0	0		126,606,651	42,110,050	33.3%
Toxaphene	0	0		0	0	2.0%
Trichloroethylene	0	0		6	0	0.0%
Total Reductions	1,820,879	375,967	20.6%	153,915,584	43,639,078	28.4%

Exhibit 4-8. Toxicity-Weighted Baseline Pollutant Loadings and Reductions (Lbs-eq/yr)

Pollutant	Low			High		
	Existing	Reductions	% Reductions	Existing	Reductions	% Reduction
Antimony (Sb)	0	0		0	0	
Arsenic (As)	592	0	0.0%	1,279,218	0	0.0%
Cadmium (Cd)	424	0	0.0%	237,971	1,170	0.5%
Chromium VI (Cr-VI)	62,454	47,113	75.4%	3,651,115	502,936	13.8%
Copper (Cu)	181,814	20,997	11.5%	212,424	38,653	18.2%
Lead (Pb)	560,936	41,882	7.5%	818,785	66,178	8.1%
Mercury (Hg)	1,057,793	791,601	74.8%	1,238,464	813,467	65.7%
Nickel (Ni)	10,593	0	0.0%	54,328	9,976	18.4%
Selenium (Se)	167	0	0.2%	62,982	59	0.1%
Silver (Ag)	172,906	105,829	61.2%	4,876,297	774,534	15.9%
Thallium (Tl)	0	0		0	0	
Zinc (Zn)	23,889	0	0.0%	74,904	3,645	4.9%
1,2 Dichlorobenzene	0	0		157,511	4,632	2.9%
1,2 Dichloroethane	0	0		2	0	
1,2 Dichloropropane	0	0		2	0	
1,2-Trans-Dichloroethylene	0	0		0	0	
1,3 Dichlorobenzene	0	0		4,425,512	0	0.0%
1,3-Dichloropropylene	0	0		0	0	
1,4 Dichlorobenzene	0	0		163,541	0	0.0%
2,4-Dinitrophenol	0	0		0	0	
2,4,6 Trichlorophenol	307	264	86.0%	656	264	40.3%
4,4'-DDD	0	0		0	0	
4,4'-DDT	4,670	0	0.0%	9,720	0	0.0%
Aldrin	8	0	0.0%	17	0	0.0%
alpha-BHC	950	0	0.0%	2,686	0	0.0%
alpha-Endosulfan	0	0		500	0	0.0%
Benzene	0	0		755	0	0.0%
Benzo (a) Anthracene	1	0	0.0%	1	0	0.0%
Benzo (a) Fluoranthene	1	0	0.0%	1	0	0.0%
Benzo (k) Fluoranthene	17	0	0.0%	17	0	0.0%
beta-BHC	3,409	0	0.0%	9,553	0	0.0%
beta-Endosulfan	0	0		4	0	0.0%
Bromoform	0	0		924	0	0.0%
Butylbenzyl-phthalate	0	0		0	0	
Carbon Tetrachloride	5,586	3,502	62.7%	5,598	3,508	62.7%
Chlordane	0	0		465	0	0.0%
Chlorobenzene	0	0		0	0	
Chlorodibromomethane	12,532	10,296	82.2%	12,533	10,296	82.2%
Chloroform	526	468	89.0%	2,806	1,098	39.1%
Dichlorobromomethane	57,456	54,669	95.1%	57,786	54,679	94.6%
Dieldrin	9,717	0	0.0%	20,028	0	0.0%
Di-n-Butyl Phthalate	0	0		0	0	
Endosulfan Sulfate	0	0		0	0	
Endrin	0	0		566	0	0.0%
Endrin Aldehyde	0	0		0	0	
Fluoranthene	0	0		171,812	0	0.0%
Fluorene	0	0		0	0	
gamma-BHC	9,128	2,849	31.2%	14,925	2,849	19.1%
Heptachlor	799	0	0.0%	1,701	0	0.0%
Heptachlor epoxide	0	0	0.0%	0	0	0.0%
Hexachlorobenzene	0	0		209,741	201,623	96.1%
Methylene chloride	7	2	31.1%	610	2	0.4%
PCBs	0	0		3,001	1,557	51.9%
Pentachlorophenol	439	387	88.0%	5,792	2,755	47.6%
Phenol	0	0		21,497	0	0.0%
TCDD	0	0		16,065	0	0.0%
Tetrachloroethylene	506	332	65.7%	513	332	64.8%
Toluene	0	0		708,997	235,816	33.3%
Toxaphene	0	0		8,118	163	2.0%
Trichloroethylene	0	0		6	0	0.0%
Total Reductions	2,177,628	1,080,192	49.6%	18,540,452	2,730,194	14.7%

Exhibit 4-9 shows the 10 largest percentage toxic-weighted reductions by pollutant anticipated under the low and high scenarios. Under the low scenario, mercury is anticipated to be reduced by more than 73%; silver accounts for nearly another 10% reduction. Overall, organic removals account for just under 7% of the total reductions. The top two organics, dichlorobromomethane and chlorodibromomethane, are reduced by 5.1% and 1.0%, respectively. The small number of pollutants for which pollutant reductions were observed was partially because, under the low scenario, EPA assumed that alternative regulatory approaches would be sought for a number of pollutants and did not take credit for potential pollutant loading reductions.

Under the high scenario, just over 80% of the total projected toxic-weighted annual reductions will come from reducing metals, including mercury, while nearly 19% of expected reductions are for organic pollutants. Of the metals that will be reduced, mercury accounts for just under 30% of the total annual reductions and silver accounts for another 28%. Of the organics, toluene and hexachlorobenzene account for 8.6 and 7.4%, respectively, of the total annual reductions, while two other organic pollutants are reduced at relatively small percentages.

Exhibit 4-9. Ranking of Ten Highest Toxic-Weighted Pollutant Reductions

Low Scenario		High Scenario	
Pollutant	**Reduction as a Percent of Total**	**Pollutant**	**Reduction as a Percent of Total**
Mercury	73.3%	Mercury	29.8%
Silver	9.8%	Silver	28.4%
Dichlorobromomethane	5.1%	Chromium VI	18.4%
Chromium VI	4.4%	Toluene	8.6%
Lead	3.9%	Hexachlorobenzene	7.4%
Copper	1.9%	Lead	2.4%
Chlorodibromomethane	1.0%	Dichlorobromomethane	2.0%
Carbon tetrachloride	0.3%	Copper	1.4%
gamma-BHC	0.3%	Chlorodibromomethane	0.4%
Chloroform	<0.1%	Nickel	0.4%
Total	**100%**	**Total**	**100%**

Note: Totals are rounded.

The estimated cost-effectiveness of the rule is shown in **Exhibit 4-10** and ranges from $22 per toxic lb-eq to $31 per toxic lb-eq. In the low scenario, the highest cost-effectiveness value was observed for the electric utilities category ($43 per toxic lb-eq), while the lowest was for the chemicals and petroleum products category at $6 per toxic lb-eq. In the high scenario, the highest cost-effectiveness value was also for the metals/transportation equipment category at $223 per toxic lb-eq, while the lowest was for POTWs at $21 per toxic lb-eq. For comparison, **Exhibit 4-11** presents cost-effectiveness estimates from previous EPA rulemakings.

Exhibit 4-10. Annual Baseline Loads, Load Reductions, and Cost-Effectiveness

Category	Low Scenario			High Scenario		
	Annual Costs[1]	Loading Reductions[2]	Cost-Effective-ness[3]	Annual Costs[1]	Loading Reductions[2]	Cost-Effective-ness[3]
POTWs - Indirect Dischargers	$7.8 $23.6	0.91	$35	$41.6 $10.1	2.47	$21
Chemicals/Petroleum Products	$0.5	0.08	$6	$4.4	0.12	$36
Electric Utilities	$0.4	0.01	$43	$0.4	0.01	$43
Metals/Transport Equipment	$0.05	0.001	$38	$0.4	0.002	$223
Miscellaneous	$0.2	0.02	$10	$1.3	0.03	$38
Lumber/Paper	$0	0	NC	$0	0	NC
All Dischargers[4]	**$33.5**	**1.08**	**$31**	**$61.0**	**2.73**	**$22**

Note: Detail may not add to total due to rounding.
[1] Millions of 1998 first-quarter dollars.
[2] Millions of toxic-weighted pounds (lb-eq)
[3] $/lb-eq
[4] Including major and minor dischargers.
NC: Not calculated.

4.5 SOURCES OF UNCERTAINTY IN THE ANALYSIS

The estimates of potential compliance costs are based on assumptions to facilitate analysis and to overcome data limitations, where necessary. EPA generally designed these assumptions to be "conservative," that is, to err on the side of estimating more stringent and costly controls than would actually be required. Some of these assumptions also may tend to overstate pollutant loading reductions. **Exhibit 4-12** provides a summary of EPA's assumptions and the potential impact on the analysis of costs and benefits.

Exhibit 4-11. Estimated Incremental Cost-Effectiveness for Direct Dischargers by Industry[1] (1998 First Quarter Dollars)

Industry	Incremental Cost-Effectiveness for Selected Technology Options ($/lb-eq removed)[2]
Aluminum Forming	174.71
Battery Manufacturing	2.89
Coil Coating – Can making	14.44
Coal Mining	None
Coil Coating	70.75
Copper Forming	38.98
Electronics I	583.32
Electronics II	Not Available
Foundries	121.28
Inorganic Chemicals I	<1.45
Inorganic Chemicals II	8.67
Iron and Steel	2.89
Leather Tanning	None
Metal Finishing	17.32
Nonferrous Metals Forming	99.62
Nonferrous Metals Manufacturing I	5.77
Nonferrous Metals Manufacturing II	8.67
OCPSF	7.22[3]
Pharmaceuticals	1.45
Plastics Molding and Forming	None
Porcelain Enameling	8.67
Petroleum Refining	None
Pulp and Paper (PCB control for De-ink subcategory only)	25.99
Textile Mills	None

[1] Toxic and nonconventional pollutants only.
[2] Updated from 1981 dollars. Reflects incremental cost-effectiveness to proceed from current levels to levels represented by best available technology economically achievable.
[3] Reflects costs and removals of both air and water pollutants.
Source: EPA, 1992.

Exhibit 4-12. Biases and Uncertainties in the Analysis

Assumption	Potential Impact on Costs	Potential Impact on Benefits	Comments
Methods used to determine reasonable potential and calculate CTR-based WQBELs based on the EPA *Technical Support Document for Water Quality-based Toxics Control* (or TSD)	?	?	The TSD provides methods that account for sample size and effluent variability. If state implementation procedures are not comparable, TSD methods may over- or understate costs.
Use of 1:1 translator to convert dissolved-form criteria to total recoverable criteria for purposes of determining reasonable potential	+	+	Tends to result in more stringent effluent limits. Tends to overestimate the reasonable potential to exceed CTR-based limits.
Plant design flow used in calculating CTR-based effluent limits	+	+	Tends to overestimate the costs and pollutant loading reduction required to achieve CTR-based limits.
Zero dilution assumed in the absence of data or information related to critical low flow for the receiving water	+	+	Tends to make WQBELs more stringent. Tends to overestimate the costs and pollutant loading reductions required to achieve CTR-based limits.
Highest reported ambient receiving water concentration used to represent the background concentration when calculating CTR-based WQBELs	+	+	Using the highest reported value potentially denies the discharger use of a portion of the assimilative capacity of the receiving water. Tends to result in a greater need for treatment, and thus, potentially higher costs and pollutant loading reductions required to achieve CTR-based limits.
In the absence of ambient receiving water data, zero used as the background concentration	-	-	Assuming zero in the absence of background data potentially allows the discharger a larger portion of the assimilative capacity of the receiving water. Tends to underestimate costs and pollutant loading reductions required to achieve CTR-based limits.
Maximum pollutant effluent concentrations observed during the monitoring period used for estimating costs if CTR-based WQBELs were exceeded (low-end scenario)	+	+	Overstates the need for pollutant reductions to meet CTR-based WQBELs; tends to overestimate costs and pollutant loading reductions required to achieve CTR-based limits

Exhibit 4-12. Biases and Uncertainties in the Analysis (Continued)

Assumption	Potential Impact on Costs	Potential Impact on Benefits	Comments
Existing permit limit, or maximum pollutant effluent concentration in the absence of a permit limit, used for estimating costs if CTR-based WQBELs were exceeded (high scenario)	+	+	If facility is in compliance with effluent limits (i.e., discharging at levels below the permit limit), overstates the need for pollutant reductions to meet CTR-based WQBELs. Tends to overestimate costs and pollutant loading reductions required to achieve CTR-based limits.
Capital costs amortized over 10 years	+	0	The useful life of most equipment currently is more than 10 years. Tends to overestimate the annual costs to a facility.

+ potentially upward bias.
- potentially downward bias.
0 neutral bias.
? direction of bias unknown.

5.0 THE BENEFITS ASSOCIATED WITH THE CTR: METHODS AND CONCEPTS

The benefits analysis presented in this document provides insight into both the types and the magnitude of the benefits expected to arise as a result of implementing the CTR.[1] This chapter presents economics concepts and analytical issues associated with defining benefit categories and developing quantified and monetized benefits estimates. Section 5.1 describes the economic concepts used in the benefits analysis. Section 5.2 discusses the limitations of the analysis.

5.1 ECONOMIC CONCEPTS APPLICABLE TO THE BENEFITS ANALYSIS

This EA uses a conceptual foundation of "economic benefits" and assigns appropriate benefit categories to define and measure those benefits attributable to implementing the CTR. The sections below define terms used in that conceptual foundation and describe the concepts.

5.1.1 Economic Benefits

The term "economic benefits" refers to the dollar value associated with all the expected positive impacts of the CTR, that is, all CTR-related outcomes that lead to higher social welfare. The monetary value of benefits is the sum of the predicted changes in "consumer (and producer) surplus." These "surplus" measures are standard and widely accepted terms of applied welfare economics, and reflect the degree of well-being enjoyed by people given different levels of goods and prices (including those associated with environmental quality).

This conceptual foundation raises several relevant issues and potential limitations for the benefits analysis. First, the standard economic approach to estimating environmental benefits is anthropocentric—all benefit values arise from how environmental changes are perceived and valued by humans. This leads to the issue of how to define and measure "ecologic benefits" that may arise above and beyond the values humans place on environmental quality improvements (e.g., the protection and enhancement of habitat and living species). A related second point is that the benefits of all future outcomes are valued in present-day values. All future physical outcomes, near-term as well as long-term, associated with reduced pollutant loadings need to be predicted and then translated into the framework of present-day human activities and concerns.

[1] Hereafter, references to the benefits resulting from the CTR, refer to the benefits that occur after implementation of the NPDES permits program to meet water quality standards established with CTR criteria. For this analysis, compliance with the CTR is expected to occur immediately. In reality, compliance, and thus costs and benefits, will occur as permits come up for review and are changed in accordance with revised water quality standards.

5.1.2 Benefit Categories Applicable to the CTR

To develop a benefits analysis, first the types or categories of benefits that apply must be defined. In this analysis, EPA relied on a set of benefits categories that applies to changes in the water resource environment. As reflected in **Exhibit 5-1**, benefits are categorized according to direct use of, or contact with, the resource.

Exhibit 5-1. Potential Benefits of Water Quality Improvements

Use Benefits	
In-Stream	Commercial fisheries, shell fisheries, and aquaculture; navigation Recreation (fishing, boating, swimming, etc.) Subsistence fishing Human health risk reductions
Near-Stream	Water-enhanced non-contact recreation (picnicking, photography, jogging, camping, etc.) Non consumptive use (e.g., wildlife observation)
Option Value	Premium for uncertain future demand Premium for uncertain future supply
Diversionary	Industry/commercial (process and cooling waters) Agriculture/irrigation Municipal drinking water (treatment cost savings and/or human health risk reductions)
Aesthetic	Residing, working, traveling, and/or owning property near water, etc.
Passive Use Benefits	
Bequest	Intergenerational equity
Existence	Stewardship/preservation Vicarious consumption
Ecologic	Reduced mortality/morbidity for aquatic and terrestrial wildlife Improved reproductive success for aquatic and terrestrial wildlife Increased diversity of aquatic and terrestrial wildlife Improved conditions for successful recovery of threatened and endangered species Improved integrity of aquatic and aquatic-dependent ecosystems

Use Benefits

Use benefit categories include in-stream, near-stream, and diversionary uses of the impacted waters and encompass both consumptive (fishing) and nonconsumptive activities (e.g., wildlife observation). In most applications to pollutant reduction scenarios, the most prominent use benefit categories are those related to recreational fishing, boating, and swimming.

Whether recreational use benefits reflect society's prime motivation for environmental protection measures is unclear. Many benefits analyses, however, focus on recreational values because they are well understood, there is a large body of empirical research to draw upon, and the associated benefits tend to be quite large. Recreational activities have received considerable empirical attention from economic researchers over the past two decades. The research relating to

recreational fishing and similar activities generally indicates that water-based recreation is a highly valued activity in today's society.

Another use benefit category of potential significance for water quality regulations is human health risk reductions. Health risk reductions can be realized through actions that reduce human exposures to risk-posing contaminants, such as exposure through the consumption of fish or drinking water containing elevated levels of pollutants. Cost savings associated with the removal of contaminants from public drinking water supply systems is another form of a potential use benefit.

Passive Use (Nonuse) Benefits

Improved environmental quality can be valued by individuals apart from any past, present, or anticipated future use of the resource in question. Such passive or nonuse values have been categorized in several ways in the economics literature, typically embracing the concepts of existence, bequest, and stewardship. These nonuse values are associated with the purely public good aspects of environmental improvement in that the utility derived by an individual is entirely non-rival (an increase in utility derived by one individual does not reduce the welfare enjoyed by any other individual) and nonexcludable (there is no feasible way to exclude any individual from deriving utility from a nonuse aspect of an environmental improvement).[2]

Passive use values may be significant, but are difficult to quantify. Whereas human uses of a resource can be observed directly and valued with a range of technical economic techniques, passive use values can be ascertained only from asking survey respondents to reveal their values. The uncertainty in ascertaining passive use values has led to considerable debate as to whether they exist for applicable changes in environmental quality and, if so, whether they are of an appreciable magnitude relative to use values.[3] For the CTR, it is believed that passive use benefits are relevant and may be appreciable.

5.1.3 The Concept and Applicability of Ecologic Benefits

Among the relevant passive use values associated with the CTR are ecologic benefits associated with decreasing the level of toxic compounds found in California waters, sediment, and associated biota. Such ecologic benefits are likely to embody reduced risks of direct mortality, and increased reproductive success, in a range of important fish and wildlife species, as well as improved ecosystem health. The species include, but are not limited to, bald eagles, other

---

[2] Many direct use benefits also arise from the public good context except, for example, to the extent that recreational benefits associated with improved water quality may be impeded by lack of access (private property holdings along the shoreline) or congestion. Nonuse benefits, on the other hand, are strictly of the nature of pure public goods, as neither access nor crowding are applicable to nonuse.

[3] For example, see Chapter 7 of the Regulatory Impact Analysis of the Proposed Great Lakes Water Quality Guidance, developed for U.S. EPA, April 15, 1993.

piscivorous avian species, mammalian species that feed on fish and crustaceans, and a wide range of aquatic species such as trout and other salmonids.

Some ecologic benefits clearly will have positive impacts that will manifest as use values (e.g., recreational angling, birdwatching). But of greater relevance is the applicability of ecologic benefits under the traditional passive use categories of existence and bequest values. One way to distinguish this, suggested by some analysts, is that passive use values remain anthropocentric, whereas ecologic benefits are held completely distinct from human valuation—making them additive to nonuse values. The question then becomes one of how to assign values to ecologic benefits for the purpose of setting priorities in policymaking.

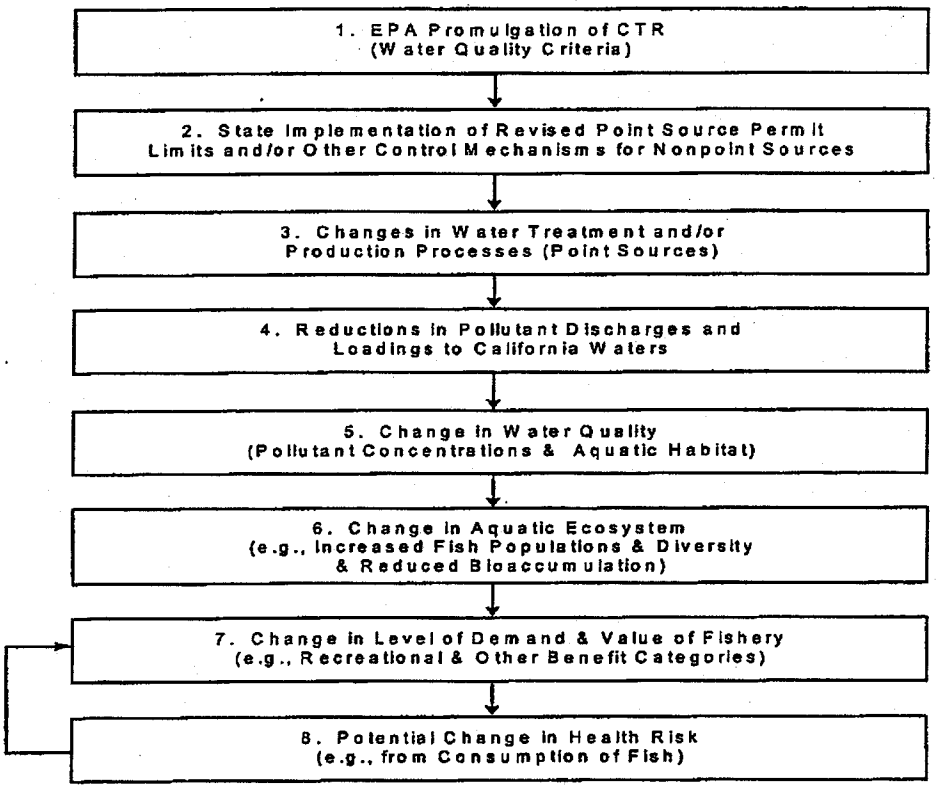
For the purposes of this EA, EPA addressed ecologic benefits in two manners. First, Chapter 6 provides a qualitative (and semi-quantitative) discussion of the physical relationships, mechanisms, and beneficial ecologic outcomes that may result from implementation of the proposed CTR. Second, for the purpose of the empirical efforts to monetize benefits, the CTR's ecologic benefits are considered to be included within passive use values and potential recreation benefits in which improved ecosystem health might be manifested.

5.2 LIMITATIONS INHERENT IN THE BENEFITS ANALYSIS

5.2.1 Causality: Linking the CTR to Beneficial Outcomes

In conducting a benefits analysis for anticipated CTR-related changes in pollutant loadings to California's waters, a chain of events must be specified and understood. As shown in **Exhibit 5-2**, this chain spans the spectrum of institutional relationships and policymaking; the technical feasibility of pollution abatement and facility-level decision-making regarding process and technology choices; the physical-chemical properties of receiving streams and their consequent linkages to biologic/ecologic responses in the aquatic environment; and human responses and values associated with these changes.

Exhibit 5-2. Chain of Events in CTR Benefits Analysis



The first two steps of Exhibit 5-2 reflect the institutional aspects of implementing the CTR, through which publication of the rule's water quality criteria is ultimately linked to state efforts to control pollutant loadings. In waters not meeting the water quality criteria, state regulators must assess how to allocate the necessary pollutant loadings reductions among various point and nonpoint sources. To the extent that these loadings reductions are assigned to point source dischargers, the state's actions will be manifested in revised point source discharge permits. The costing analysis for the CTR presumes that all loadings reductions will be generated through point source controls; however, it is possible that state regulators will implement the rule such that nonpoint source control efforts may be used in addition to some portion of the point source controls assumed here.

In steps 3 and 4, the revised state permit limits ultimately result in a change in pollutant loadings

for targeted contaminants (as well as those removed incidental to the improved wastewater treatment or process changes), from an appropriately defined set of baseline loadings. The actual manner in which the loadings reductions are achieved will depend on treatment technology and process changes selected by individual facilities. These technology choices will determine the compliance costs and loadings reductions.

Next, as shown in steps 5 and 6 of Exhibit 5-2, pollutant loading reductions (from step 4) need to be converted into changes in environmental conditions such as physical/chemical parameters (in-stream pollutant concentrations) and the consequent improvement in biota (e.g., increased diversity and size of fishery populations). In lieu of detailed water quality and ecologic (e.g., fisheries) modeling, which was infeasible within the time frame and budget limits of this analysis, this benefits analysis relies on a more ad hoc characterization of the specific pollutants addressed and their links to restricted beneficial uses of the resource. These are described, in part, in Chapter 6.

Finally, in steps 7 and 8, the analysis reaches the stage at which anthropocentric benefit concepts begin to apply, such as illustrated by the link between improved fisheries and the enhanced enjoyment realized by recreational anglers. These final steps reflect the focal point of the quantitative benefits analysis presented in Chapter 8, and are defined by the benefits categories described above. But as noted below, there are several issues that inhibit the ability to accurately forecast the extent to which the CTR may generate such benefits.

5.2.2 Temporal and Spatial Issues

As noted above, it is important to recognize the analytic challenges and resulting limitations associated with estimating the benefits of reducing discharges of toxic pollutants to all California waters. An empirical benefits assessment is a difficult and uncertain undertaking under the best of circumstances. In the case of the CTR, the challenges and limitations are magnified by several important considerations, including, but not limited to the following:

- *The time path to ecosystem recovery from near-term reductions in toxic loadings.* Many of the toxic compounds relevant to the CTR are persistent in the environment; therefore, even the total elimination of additional loadings of these compounds may not immediately alter water column or fish-tissue concentrations. A significant portion of the benefits may be realized only in the relatively distant future.

- *The geographic scope of contamination and of benefit-generating activities throughout the varied watershed ecosystems of California.* Typically, the areal extent of toxic contamination is very widespread, even if it originates from a well-defined source at a specific location. Contamination becomes even further dispersed through uptake in the food chain. Thus, the benefits of reducing toxic discharges within the state's watersheds are likely to extend beyond the boundaries of the state's "impaired" waters.

The time-path issue can be addressed, in part, through the use of alternative discounting regimes in the benefits analysis. The geographic scope issue is more difficult to address empirically, other than to recognize the high probability that beneficial results of the CTR will be realized beyond the boundaries of impaired state waters.

5.2.3 Attribution of Benefits to the CTR

For this analysis, EPA had data and information to estimate large-scale changes in water quality beyond present day conditions and then attributed the CTR for its contribution to these changes. First, the current total pollutant loadings from all sources that are contributing to the toxics-related water quality problems observed in the state are assessed. This defines the overall magnitude of the loadings "problem." Second, the share of the total loadings problem that is attributable to sources that are likely to be controlled via the CTR are estimated. Since this analysis was designed to focus only on those controls imposed on point sources, this stage of the process entailed examining the portion of total loadings originating from point sources (see Chapter 7). Third, the percent reduction in point source loadings expected due to implementation of the CTR is estimated, then applied to the share of point source loadings.

For example, if the total benefits of moving from baseline water quality to having all of California's waters completely unimpaired were estimated to be $500 million per year, and point sources contributed 40% of the toxic-weighted pollutant loadings that contributed to baseline impairments, then one would estimate (absent more refined data) that perhaps $200 million of the potential water quality benefits would be attributable to the potential elimination (100% reduction) of all point source discharges. If the CTR was expected to achieve a 50% reduction in the offending point source discharges, one would then develop an estimate of $100 million as a rough approximation of CTR-related benefits.[4] Thus, total baseline pollutant loads, and anticipated loadings reductions, are used as a means to approximate roughly the share of total potential water quality benefits that may be attributed to the rule. In the example above, the CTR would be viewed as addressing 20% of the total loadings problem (reducing by 50% the 40% of total loadings due to point sources).

Yet one of the difficulties in applying the loadings-based attribution approach is obtaining and interpreting data on baseline loadings. The problem entails two significant challenges:

- *Developing reliable estimates of both ongoing point source loadings and current nonpoint source loadings.* This is difficult because nonpoint loadings come from a wide variety of sources that are difficult to measure, including atmospheric deposition and agricultural and urban runoff. Thus, nonpoint source loading estimates are probably highly imprecise and very incomplete because they likely omit sources underestimating load estimates. Even point source estimates of

[4] Forty percent of $500 million equals $200 million; 50% of this $200 million equals $100 million.

loadings are imprecise because discharged concentrations may be below detection limits (i.e., "hidden loads" may exist in discharge data).

! *Accounting for the share of the current loadings versus those attributable to historical discharges from point and nonpoint sources.* Many of the pollutants addressed by the CTR are persistent (e.g., metals) and bioaccumulative (e.g., dioxins, PCBs, and selected agricultural chemicals). Their presence in the water column, sediment, and biota of California waters may be largely due to historical discharges rather than current loadings. The degree to which historical loads contribute to present-day concentrations will vary according to many complex contaminant- and site-specific factors. However, historical loads may, in some instances, be the predominant source of toxics-related water quality problems. In such instances, efforts to control current discharges may be of relatively limited effectiveness and value.

These complicating factors are difficult to account for in the attribution analysis. Nonetheless, they need to be kept in mind when interpreting the loadings data that are available for an apportionment analysis. These issues are described in greater detail in Chapter 7.

6.0 QUALITATIVE ASSESSMENT OF POTENTIAL ECOLOGICAL BENEFITS

This chapter describes the types of ecological benefits anticipated to result from implementation of the CTR. Improvements in ambient water quality, anticipated under the rule, are expected to result in substantial ecologic benefits through improvements in ecosystem health. This chapter provides an overview of the adverse effects of toxics on California's diverse ecological systems, shows how improved ambient water quality can translate into improved ecosystem health, and qualitatively assesses the ecologic benefits anticipated under the proposed rule.

Section 6.1 gives an overview of the diversity of ecological systems in California. Section 6.2 summarizes the occurrence and ecological effects of toxics in California aquatic systems. Section 6.3 describes how CTR-related toxics reductions may result in improved ecosystem health through ecological and toxicological interactions. Section 6.4 provides a qualitative discussion of potential ecologic benefits of the proposed rule.

6.1 ECOLOGICAL DIVERSITY OF AQUATIC ENVIRONMENTS IN CALIFORNIA

California is one of the most biologically diverse areas in the world (U.S. EPA, 1997). Within its 160,000 square miles of land, and hundreds of thousands of acres and miles of estuaries, wetlands, rivers, streams, and lakes, California harbors more unique plants and animals than any other state in the nation. The diverse climates, landscapes, habitats, and migration barriers such as mountains and deserts, have led to the evolution of a large number of isolated species and varieties of animals, many of which are found only in California (Steinhert, 1994, as cited in U.S. EPA, 1997). For example, there are 46 species of amphibians, 96 species of reptiles, 563 species of birds, 190 species of mammals, 8,000 species of plants, and 30,000 species of insects recorded in the state. In addition, 63 types of freshwater fish are found only in California (Moyle, 1994, as cited in U.S. EPA, 1997). Additionally, California's aquatic systems provide important habitat for migratory species such as waterfowl.

Unfortunately, California's ecological diversity is threatened (U.S. EPA, 1997). On average, more than 20 percent of the naturally occurring species of amphibians, reptiles, birds, and mammals are classified as endangered, threatened, or of "special concern" by state and federal agencies. California has more threatened and endangered species than any other state in the United States. Many of these species exist in or are dependent on aquatic resources during all or part of their lives, and consequently may be adversely affected by toxic discharges to surface waters (U.S. EPA, 1997).

6.2 OCCURRENCE AND ECOLOGICAL EFFECTS OF TOXICS IN CALIFORNIA AQUATIC SYSTEMS

Current concentrations of toxics in California's aquatic systems may pose substantial risk to resident and migratory biota through direct and indirect pathways of exposure in the surface waters, diets, or sediments. It appears that a variety of toxics are widely distributed throughout California, which increases the likelihood that many of the resources are exposed to concentrations potentially causing adverse effects on ecological resources (U.S. EPA, 1997). Toxicity may occur with either acute (short-term) or chronic (long-term, sublethal) exposure to contaminants. Exposure to chronic, low levels of toxics found in California's aquatic environments can adversely affect the resources by causing physiological and behavioral impairments in organisms, contamination or reduction of food-web resources, and alteration of habitats. Improving ambient water quality would put the ecological and biological resources at less risk of exposure. Improved water quality through toxics reductions would also reduce the risk of disturbances to the ecological integrity and important habitats of the biological resources of California.

A key to understanding the potential benefits of the proposed rule on the ecological resources of California is a knowledge of the occurrence, exposure pathways, and effects of toxics occurring in California's aquatic systems. These factors are discussed below.

6.2.1 Occurrence of Toxics-Related Impairments

As shown in **Exhibit 6-1**, California's aquatic ecosystems in all areas of the state exhibit impaired water quality from toxics such as metals, selenium, pesticides, and priority organics such as PCBs (U.S. EPA, 1997).[1] The Analysis of the Potential Benefits Related to Implementation of the California Toxics Rule (U.S. EPA, 1997) summarizes ambient water quality impairment in California and notes the following:

- Available data suggest that over 800,000 acres of assessed bays, estuaries, lakes, and wetlands may be impaired by one or more toxic pollutants, as are over 3,700 miles of rivers. Most notably, over two-thirds of the assessed area of both bays and saline lakes may be adversely affected by toxics.

- Inorganic pollutants such as metals and trace elements (particularly selenium) are the most significant categories of toxic pollutants affecting the water quality in assessed waters statewide. Pesticides are also associated with large areas of water quality impairment.

[1] Impaired waters are defined as those that have been rated by the State of California as medium or poor for at least one toxic pollutant or group of pollutants. California's medium and poor waters correspond to U.S. EPA's categories of not fully or partially supporting designated uses. The medium and less severely impaired waters were grouped together into the partially supporting category. The remaining waters classified as poor were placed in the not fully supporting category.

- Trace elements (especially selenium) may be responsible for water quality impairment in 52% of all bays, 55% of rivers and streams assessed, and 16% of all lakes and reservoirs. In addition, trace elements may impair water quality in all saline lakes in the state.

- Based on the areal extent of contamination and the uses of affected water bodies, San Francisco Bay and the Central Valley appear to be the areas most influenced by toxic contamination. In addition, toxics are responsible for impaired water quality in a high percentage of river and saline lake areas in the Colorado River Basin. These areas constitute those most extensively affected by toxics, but waters in all regions of California show some degree of impairment by toxics.

- Both point and nonpoint sources play a role in contributing to toxic pollution. Agriculture, primarily agricultural drainage, is the most frequently cited source of pollutants that impair rivers and is also frequently cited as a contributor to the impairment of lakes and reservoirs. Urban runoff and "other" nonpoint sources (e.g., deposition and spills) are most frequently cited as contributing factors to water quality problems in toxics-impaired bays. Mining is the most frequently cited source (mining operations may or may not be a point source), particularly for lakes and reservoirs, and toxics discharged by municipal wastewater treatment plants contribute to the impairment of a variety of water body types, particularly estuaries and wetlands.

- Toxic pollutants are of concern in a large number of waters designated for the support of terrestrial and aquatic wildlife. In addition, water quality in 175,000 acres of bays/harbors, 52,000 acres of estuaries, 102,000 acres of lakes, 1,000 miles of rivers and streams, and 11,000 acres of saline lakes that support fish spawning and/or migration may be impaired by toxics.

- Toxics may contribute to impaired water quality in approximately 176,000 acres of bays or harbors, 1,856 river miles, 230,000 acres of saline lakes, and 5,000 acres of estuaries designated for the support of rare, threatened, or endangered species.

- Currently, there are 12 fish consumption health advisories in waters covered by the CTR (9 inland water bodies and 3 enclosed bays and estuaries) because of high levels of contamination in fish tissue from mercury, PCBs, chlordane, dioxin, DDT, pesticides, and selenium. Some of these tissue contaminants are also hazardous to fish and piscivorous (fish-eating) species as well.

- Currently, there are four waterfowl health warnings for consuming waterfowl taken from the Grasslands area, Suisun Bay, San Pablo Bay, and San Francisco Bay because of elevated selenium levels in waterfowl such as duck, greater and lesser scaup, and scoters. Selenium contaminant levels are also a concern for waterfowl health.

Exhibit 6-1. Summary of Baseline California Regional Water Quality Assessments[1]

Region	Areal Extent of Toxics Impairment	Pollutants of Concern	Primary Pollutant Sources	Key Water Bodies Impaired	Ecological Resources Potentially Affected
Region 1: North Coast Region	55% of bays (16,500 acres); minor impairment of other water bodies	Metals, pesticides	Mix of point sources (municipal and industrial effluent) and nonpoint sources (agriculture and urban runoff)	Arcata Bay, Humboldt Bay	Wildlife habitat; fish spawning and migration; rare and endangered species
Region 2: San Francisco Bay	Large areas impaired by toxics, including 70% of bays (200,000 acres); 60% of wetlands (57,000 acres); 39% of rivers (244 miles); 172,000 acres impaired supporting fish spawning/migration and rare and endangered species	Metals, trace elements, priority organics	Urban runoff and other nonpoint sources affect largest areas; some impairment from municipal and industrial point sources	San Francisco Bay (Lower, Central, South) Suisun Marsh	Wildlife habitat; fish spawning and migration; rare and endangered species; waterfowl; piscivorous wildlife in San Francisco Bay, Lake Herman, Guadalupe Reservoir; and other species
Region 3: Central Coast Region	47% of lakes (11,700 acres); 36% of estuaries (1,700 acres); minor impairment of rivers and bays	Metals, pesticides	Agriculture, mining, unspecified nonpoint sources	Morro Bay, Carpinteria Marsh, Elkhorn Slough	Wildlife habitat; fish migration and spawning; rare and endangered species; piscivorous wildlife in Nacimiento River
Region 4: Los Angeles Basin	Over 90% of bays and estuaries impaired (16,000 acres); minor impairment of rivers and lakes	Pesticides, priority organics, trace elements, metals	Mix of point sources (municipal treatment, "other" point sources) and nonpoint sources (agriculture, hydrological modification, and urban runoff)	Mugu Lagoon, San Gabriel River (lower), Los Angeles River (upper)	Wildlife habitat; fish migration and spawning; rare and endangered species; piscivorous wildlife in Lake Nacimiento and Los Angeles Harbor

Exhibit 6-1. Summary of Baseline California Regional Water Quality Assessments[1] (Continued)

Region	Areal Extent of Toxics Impairment	Pollutants of Concern	Primary Pollutant Sources	Key Water Bodies Impaired	Ecological Resources Potentially Affected
Region 5: Central Valley Region	Large areas impaired by toxics, including 100% of estuaries (48,000 acres); 23% of lakes (120,000 acres); 21% of rivers (1,200 miles); 48,000 acres of Delta waterways impaired for fish spawning/migration and rare and endangered species	Metals, trace elements	Agriculture, mining; smaller areas affected by municipal treatment, urban runoff, storm sewers, and other nonpoint sources	Delta Waterways, Clear Lake, American River, Feather River, Sacramento River, Grasslands, Marshes, Shasta Lake	Wildlife habitat; fish spawning and migration; rare and endangered species, piscivorous wildlife in Clear Lake, Lake Berryessa, and Grasslands area; waterfowl in Grasslands area
Region 6: Lahontan Region	34% of saline lakes (66,000 acres); 19% of lakes (36,000 acres); 13% of rivers (372 miles)	Metals, trace elements, priority organics	Naturally occurring levels of metals and trace elements; lesser areas affected by agriculture, land development, and mining	Eagle Lake, Owens River, Truckee River, Honey Lake	Wildlife habitat; fish spawning and migration; rare and endangered species
Region 7: Colorado River Basin	60% of rivers (1,400 miles) impaired; 220,000 acres of saline lake (Salton Sea) supporting rare and endangered species and wildlife	Pesticides, trace elements	Agriculture	Salton Sea	Wildlife habitat; rare and endangered species; piscivorous wildlife and waterfowl in Salton Sea
Region 8: Santa Ana River Basin	Over 90% of bays and estuaries impaired (4,000 acres); 27% of lakes (4,000 acres)	Metals, pesticides	Primarily nonpoint sources including agriculture, urban runoff, and land development	Upper Newport Bay	Wildlife habitat; fish spawning and migration; rare and endangered species
Region 9: San Diego Basin	14% of estuaries; minor impairment of other water bodies; 239 acres San Diego Bay impaired supporting fish spawning/ migration and rare and endangered species	Metals, pesticides, priority organics, trace elements	Estuaries affected by land disposal; other water bodies affected by diverse mix of point and nonpoint sources.	San Diego Bay, Tijuana River Estuary	Wildlife habitat; fish spawning and migration; rare and endangered species

[1] Based on 1994 assessment of water quality. Some key water bodies impaired by toxics have changed since that time; however, more recent data were not used in the preparation of this report due to time constraints.
Source: U.S. EPA (1997).

This summary of water quality impairment indeed reveals that a variety of aquatic and terrestrial biota are exposed to the toxics regulated by the CTR.

6.2.2 Exposure Pathways

Toxics present in California's aquatic systems can affect ecological resources through direct or indirect pathways of exposure. Direct pathways of exposure occur when natural resources come in direct contact, either singularly or in combination, with toxics in the water column, sediments, or diet. Indirect pathways of exposure occur when habitat resources (e.g., spawning beds, prey sources) have been reduced or otherwise altered by toxics. Toxics also may be bioaccumulated in aquatic organisms, making them available to terrestrial predators dependent on the aquatic food web of the contaminated system. The extent to which the organisms are adversely affected largely depends on the pathway and duration of exposure as well as the concentration and type of toxics present in the pathway.

6.2.3 Potential Effects of Toxics on Ecological Resources

Ecological resources potentially affected under state implementation include biota and ecosystem function and integrity.

Effects on Biota

Biological organisms are effective receptors for toxics in aquatic systems through the uptake, accumulation, and eventual biological disposition of contaminants. Uptake of toxics results from the following various exposure pathways, singularly or in combination: diet, water, and sediment. Accumulated toxics associated with ambient waters may concentrate in various tissues and organs of biota. The specific tissues/organs affected depend on the exposure pathways, the exposure concentrations, and the ability to metabolize or excrete the accumulated contaminants. An organism's ability to metabolize contaminants largely depends on the presence/absence and relative abundance of various enzymes necessary to transform different components into excretable compounds.

The effects of toxics on aquatic resources must be evaluated because even low contaminant concentrations in water, sediment, or diet may impair fitness, produce adverse physiological effects that lead to death, or lower long-term survivability in the wild. There is extensive documentation of the long-term, injurious effects of inorganic (e.g., heavy metals) and organic (e.g., polychlorinated biphenyls, pesticides, aromatic hydrocarbons) contaminants at relatively low concentrations to aquatic biota (Rand and Petrocelli, 1985; Hoffman et al., 1995).

Exposure to contaminants found in California's aquatic systems can affect various biological levels of organization, resulting in four identified biotic responses: lethal toxicity, sublethal

toxicity, bioaccumulation, and habitat alteration. These biotic responses provide broad categorization for a multitude of specific biotic responses **(see Exhibit 6-2)**.

Exhibit 6-2. Biological Organization Levels Associated with Responses to Toxics in Water

Biotic Response	Subcellular	Cellular	Organism	Population	Community	Ecosystem
Lethal Toxicity	▯	▯	▯	▯	▯	▯
Sublethal Toxicity	▯	▯	▯	▯	▯	▯
Bioaccumulation	▯	▯	▯	▯	▯	▯
Habitat Alteration			▯	▯	▯	▯

Lethal toxicity refers to the direct disruption of subcellular or cellular physiological activities that result in death of the organism. The death of individuals from populations can influence the future reproductive viability of populations, and in turn may influence organisms at higher trophic levels. Sublethal toxicity also involves interference of subcellular and cellular processes, but does not result in immediate death; death may occur because of impaired behavior, or impaired physiological or biochemical processes.

Bioaccumulation of contaminants found in California aquatic systems is important because the health of organisms may be affected (e.g., reducing growth or reproduction; increasing susceptibility to disease). Bioaccumulation also results in additional pathways for contaminant transfer throughout the food chain. Impaired physiology or contaminant transfer through food chains owing to bioaccumulation can have dramatic impacts on all levels of biological organization. For instance, accumulated contaminants (or metabolites of these contaminants) transferred through food webs may concentrate in food sources of piscivorous fish, which can adversely affect important recreational or commercial fisheries.

Habitat alteration includes effects on the physical and chemical environment that can result in unsuitable habitat for both resident and migratory biota at the level of the organism and the population. For example, biodegradation of organic contaminants by sediment microbes results in anoxic conditions unsuitable for benthos. The physical and chemical alteration of particular habitats can shift species composition, abundance, and diversity. Any change in species composition directly reflects altered community structure, and can alter ecosystem functions.

Toxics of particular concern in California are listed in **Exhibit 6-3**, along with their potential adverse effects on biota. In addition to the potential adverse effects of toxics discussed above, exposure to certain toxics present in California's aquatic systems, including aromatic hydrocarbons and heavy metals, can increase the rate of genetic mutations. Increased rates of genetic mutations can reduce the fitness of individuals and populations, especially in contaminated areas providing breeding or spawning habitat because there would be greater risk to embryonic life stages undergoing rapid development.

Exhibit 6-3. Overview of Adverse Effects of Toxics

Toxic of Concern	Potential Affected Ecological Resource in California	Potential Adverse Effects on Biota[1]	Reference
Arsenic	Aquatic biota Birds Mammals Water Sediment	Reduced growth and survival Impaired reproduction Impaired physiology Decreased resistance to infection Mutagenic Teratogenic Carcinogenic	Eisler (1988a)
Cadmium	Aquatic biota Birds Mammals Water Sediment	Reduced growth and survival Impaired reproduction Possible mutagen Teratogenic Carcinogenic	Eisler (1985a)
Chromium (III and VI)	Aquatic biota Birds Mammals Water Sediment	Reduced growth and survival Impaired reproduction Mutagenic Teratogenic Carcinogenic	Eisler (1986a)
Copper	Aquatic biota Birds Mammals Water Sediment	Reduced growth and survival Impaired reproduction Impaired metabolism	U.S. EPA (1985); Goyer (1991)
Dioxin	Aquatic biota Birds Mammals Water Sediment	Reduced growth and survival Impaired reproduction Compromised immunity Mutagenic Teratogenic Carcinogenic	Eisler (1986b)
Endosulfan	Aquatic biota Birds Mammals Water Sediment	Reduced growth and survival Impaired reproduction Impaired behavior Suspected mutagen	Verschueren (1983); Smith (1991)
Lead	Aquatic biota Birds Mammals Water Sediment	Reduced growth and survival Impaired reproduction Impaired development Impaired metabolism	Eisler (1988b)

Exhibit 6-3. Overview of Adverse Effects of Toxics (Continued)

Toxic of Concern	Potential Affected Ecological Resource in California	Potential Adverse Effects on Biota[1]	Reference
Mercury	Aquatic biota Birds Mammals Water Sediment	Reduced growth and survival Reduced reproduction Impaired development Impaired behavior Mutagenic Teratogenic Carcinogenic	Eisler (1987a)
Nickel	Aquatic biota Birds Mammals Water Sediment	Reduced growth and survival Reduced reproduction Carcinogenic	U.S. EPA (1980a)
Polycyclic Aromatic Hydrocarbons (PAHs)	Aquatic biota Birds Mammals Water Sediment	Reduced growth and survival Reduced reproduction Compromised immunity Mutagenic (4-7 Ringed PAHs) Teratogenic (4-7 Ringed PAHs) Carcinogenic (4-7 Ringed PAHs)	Eisler (1987b)
Polychlorinated Biphenyls (PCBs)	Aquatic biota Birds Mammals Water Sediment	Reduced growth and survival Reduced reproduction Impaired behavior Compromised immunity Mutagenic Teratogenic Carcinogenic	Eisler (1986c)
Selenium	Aquatic biota Birds Mammals Water Sediment	Reduced growth and survival Reduced reproduction Impaired behavior Impaired physiology	Eisler (1985b)
Silver	Aquatic biota Birds Mammals Water Sediment	Reduced growth and survival Reduced reproduction Impaired physiology	Goyer (1991); U.S. EPA (1980b)
Zinc	Aquatic biota Birds Mammals Water Sediment	Reduced growth and survival Impaired physiology Teratogenic to amphibians Reduced reproduction	Eisler (1993)

[1] The potential for adverse effects to ecological resources are dependent on numerous factors, including the exposure route, the exposure duration, the dose, the sensitivity of the organism, and the bioavailability of the chemical. Information in this table describes the common biological effects associated with each toxic of concern (U.S. EPA, 1997). Effects may not be present for all ecological resources listed. In addition, concentrations of these toxic compounds in California may not be high enough to result in these adverse effects on biota.

Effects on Ecosystems

In addition to adverse effects on biota, toxics also may adversely affect ecosystem function and integrity through direct and indirect effects on biota. The effects of toxics in ecosystems are complex and difficult to estimate because of the diversity of species assemblages and trophic interactions (Barron and Woodburn, 1995). For example, predators may switch to alternate prey (Eaton et al., 1985), or phytoplankton abundance may be maintained by changes in the dominant algae species (Brock et al., 1992). Also, several species may perform similar functions, with sensitive species replaced by more contaminant tolerant species. While these changes may result in overall ecosystem resistance to toxics, there could be major changes in ecosystem structure (Barron and Woodburn, 1995). Contaminant effects on ecosystem structure, however, are likely to be specific to the type and location of the water body and the toxic exposure scenario.

6.3 POTENTIAL ECOLOGIC BENEFITS OF THE RULE

As discussed in Chapter 5, ecosystems and their biological resources provide benefits through enhanced ecological services that often manifest as direct use values, passive use values and, to the extent not reflected elsewhere, ecologic benefits.

This section provides a qualitative description of potential ecologic benefits resulting from improvements in ecosystem health under the proposed rule. A qualitative description of ecologic benefits is provided because of the complexity and diversity of California aquatic systems and the diversity of ecological receptors; the multitude of contaminants and exposure conditions; the complexity of ecosystem structure and function; and uncertainty regarding the extent to which the CTR will result in toxics loading reductions significant enough to generate appreciable changes in ambient concentration and ecosystem health. However, improved water quality may provide potential benefits to the ecological resources ". . . that exist in or are dependent on more than 800,000 acres of assessed bays, estuaries, lakes, and wetlands and more than 3,700 miles of rivers that are now currently impaired by toxic pollutants" (U.S. EPA, 1997). The extent, magnitude, and nature of the ecologic benefits accruing under the CTR will depend on the specific ecosystems and toxics affected, baseline conditions, the degree and type of ambient water quality improvements, and the time horizon for improvement.

Toxics reductions under the CTR may provide ecologic benefits through increased ecosystem stability, resilience, and overall health (U.S. EPA, 1997). Benefits are difficult to quantify because of the complexity, scale, and uncertainties of the interaction of the multitude of ecological systems and toxics to be affected by the proposed rule. However, ecologic benefits from the proposed rule may be substantial because of the extensive variety, proportion, and geographic area of the affected aquatic systems, the diversity and uniqueness of California ecological resources, and the large number of toxics to be regulated under the CTR (U.S. EPA, 1997).

Without conducting a complete analysis as described above, EPA concludes that potential ecologic benefits from implementation of the CTR may include (U.S. EPA, 1997):

- Reductions in toxics loadings that lead to improved conditions for California fish spawning and/or migration in bays/harbors and estuaries, lakes, rivers, streams, and saline lakes

- Reductions in bioaccumulative chemicals of concern that currently may affect fish and wildlife throughout the state, including selenium, mercury, PCBs, dioxins, and chlorinated pesticides

- Reductions in toxics that improve conditions for the successful recovery of federal and state threatened and endangered species, such as the delta smelt, desert pupfish, California brown pelican, bald eagle, California clapper rail, California tiger salamander, and western snowy plover

- Reductions in toxics that decrease adverse toxics-related impacts on aquatic and terrestrial wildlife in two important areas of California: the San Francisco Bay watershed and the Central Valley (see case studies in U.S. EPA, 1997)

- Reductions in the concentrations of both selenium and pesticides in the waters that feed the Salton Sea that may improve conditions for the restoration and maintenance of currently declining populations of wildlife, including threatened and endangered species such as the California brown pelican, peregrine falcon, bald eagle, Yuma clapper rail, and desert pupfish (see Case Studies in U.S. EPA, 1997)

- Improved water quality and associated improvements in survival, growth, and reproductive capacity of aquatic and aquatic-dependent organisms that will help restore and sustain California's ecological diversity.

7.0 BENEFITS METHODOLOGY ISSUES: CONTRIBUTION OF POINT SOURCES TO TOXICS-RELATED WATER QUALITY PROBLEMS

Estimating the benefits of implementation of the CTR is difficult because there is limited information regarding the contribution of point sources to the toxic-related water quality problems in California. This issue of attribution has important implications for the potential benefits of point source controls. Benefits analyses of water quality regulations may be able to utilize existing literature, applied research, and data to estimate society's values for water quality improvements. Often, there are limited data with which the contribution of point source controls to these improvements can be discerned.

To estimate the potential benefits of the CTR, EPA evaluated the limited available data on loadings from various sources to California watersheds. Based on these data, EPA developed ranges of values to reflect the potential contribution of point sources to current toxic-related water quality problems in San Francisco Bay, other bays and estuaries, and freshwater. EPA then used these assumptions to estimate the benefits of the proposed rule (see Chapter 8). This chapter describes the data EPA used to develop the attribution assumptions, and the uncertainties surrounding these estimates, as presented originally in U.S. EPA (1997).

EPA solicited additional data and information on the relative contribution of point sources to toxic pollutant loadings in California waters in the EA that accompanied the proposed rule, however, commenters did not submit any new data. EPA then conducted a new literature search and contacted universities and organizations in search of additional data and studies. In general, the studies found very little detailed information and data. One study of the Santa Monica Bay watershed (California Regional Water Quality Control Board, 1997), however, contains an assessment of the relative loadings from point and nonpoint sources. As described in Section 7.2, EPA updated its analysis to incorporate this information.

7.1 SAN FRANCISCO BAY

EPA used two sources to characterize the relative contributions of point and nonpoint sources of toxic loadings in San Francisco Bay: Davis et al. (1991) and National Oceanic and Atmospheric Administration (NOAA)(1988a). Davis et al. estimated that 5,000 to 40,000 metric tons of at least 65 different pollutants are released annually into the San Francisco estuary from both point and nonpoint sources. They estimated point source loadings based on municipal (POTW) and industrial NPDES effluent monitoring data from 1984 to 1987. They estimated nonpoint source loadings using estimates of urban and nonurban runoff, riverine inputs, atmospheric deposition, oil spills, and contributions from dredging activities. Estimates of urban runoff and dredging came from Gunther et al. (1987)[1]. Estimates of nonurban runoff were based on a NOAA model that factors in sediment loss from nonurban lands and average trace metal concentrations in soil.

[1] Other studies suggest that Gunther et al. (1987) may have underestimated the contribution from dredging activities.

Riverine inputs were based on pollutants from the Sacramento and San Joaquin rivers. All pollutants transported past the cities of Sacramento and Vernalis were considered riverine input from the Sacramento and San Joaquin Rivers, respectively. The loading from the Sacramento River was based on a 1987–88 study of selenium cycling conducted by the California Department of Water Resource. The loading from the San Joaquin River was based on 1985–87 water quality data collected by the U.S. Geological Survey (USGS). Atmospheric deposition loadings were based on measurements in other parts of the United States, as reported in Gunther et al. (1987).

NOAA (1988a) estimated that approximately 22,000 metric tons of toxic substances are released annually into the San Francisco estuary. They estimated point source loadings based on municipal (POTW) and industrial effluent monitoring data. Estimates of nonpoint source loadings include urban and nonurban runoff, and riverine inputs. NOAA (1988a) estimated urban runoff by combining runoff coefficients and pollutant concentrations with:

- Estimates of total county and city urban land area and population (U.S. Bureau of Census, 1980)
- POTW wastewater and storm water conveyance and treatment data (U.S. EPA, 1982)
- Weather station and precipitation data (provided by NOAA's National Climatic Data Center)
- Information on urban land use activities (obtained from USGS's Land Use Data Analysis System).

To estimate the contribution of nonurban runoff to loadings, NOAA (1988a) examined areas where:

- Farming, silviculture, or other activities have exposed soil to wind, rain, and runoff
- Soil is most erodible
- Large amounts of chemical fertilizers and pesticides have been applied
- Sufficient runoff exists to transport pollutants.

NOAA (1988a) obtained the majority of the data for its analysis from the USGS's Land Use Data Analysis System, the U.S. Department of Agriculture's 1982 National Resource Inventory, and a study by Shacklette and Boerngen (1984). NOAA (1988a) also estimated riverine inputs from the Sacramento and San Joaquin rivers using raw USGS data in a simulation model.

Exhibit 7-1 presents the estimated contribution of point sources to toxic loadings in the San Francisco Bay based on the Davis et al. (1991) and NOAA (1988a) studies. Using these studies, EPA developed toxicity-weighted averages across the pollutants evaluated to reflect the contribution of point sources to San Francisco Bay. This resulted in an estimate of 3.4% for the NOAA data based on the median weight for the class of chlorinated hydrocarbon pesticides,[2] and a range of 1.5% to 7.1% for the Davis et al. data. In light of the uncertainties in the estimates, for the purposes of estimating the potential benefits of the point source controls of the CTR, EPA assumed that point sources contribute between 1% and 10% of total toxic loadings to San Francisco Bay.

Exhibit 7.1 Estimated Contribution of Point Sources to Toxic Pollutant Loadings in San Francisco Bay (Toxic-Weighted)

Pollutant	NOAA[1]	Davis et al.[2]
Zinc	5.2%	4.0–18.9%
Copper	5.5%	4.0–11.9%
Nickel	Not Estimated	26.4–27.6%
Lead	7.4%	2.3–8.5%
Chromium	2.6%	0.8–5.7%
Arsenic	11.4%	3.8–6.1%
Cadmium	15.6%	29.5–64.8%
Selenium	Not Estimated	28.4–28.4%
Mercury	6.9%	26.4–51.8%
Chlorinated Hydrocarbon Pesticides	51.5%	Not Estimated

[1] Toxic-weighting based on loadings from the NOAA (1988a)
[2] Source: U.S. EPA (1997); range based on data from Davis et al. (1991).

EPA's analysis is subject to a number of uncertainties and limitations. First, Davis et al. and NOAA relied on assumptions about concentrations below the detection limit to estimate pollutant loadings. However, the concentration of pollutants below the deduction limit is unknown. Second, studies do not include estimates for some point and nonpoint sources of pollutants such as "historic" loadings from contaminated sediment or point source mine drainage. Third, Davis et al. and NOAA classify riverine inputs as nonpoint sources. It is possible that a portion of these riverine inputs is attributable to point sources; however, this could not be estimated based on available data. Fourth, the data from both studies are based on discharges from the early and mid-1980s and, therefore, may not be representative of current conditions in San Francisco Bay. Finally, Davis et al. did not estimate the contribution from pollutants, other than selenium, in the Sacramento River, and did not have local data for the estimates of urban runoff and atmospheric deposition. The use of data on atmospheric deposition from other parts of the United States would tend to overestimate nonpoint source loadings (and thus underestimate point source loadings) because there are relatively fewer air sources of toxics that

[2] The weights for hydrocarbon pesticides range from 0.35 for trichlorophenol to 57,000 for dieldrin, with a median for the class of 100.

might reach the bay given the prevailing westerly winds off the ocean.

7.2 OTHER BAYS AND ESTUARIES

EPA used NOAA's National Coastal Pollutant Discharge Inventory (1988b and 1988c) to estimate the relative contribution of point sources to toxic loading in five California bays: San Diego, Humboldt, Monterey, Santa Monica, and San Pedro (see **Exhibit 7-2**)[3].

Exhibit 7-2. Estimated Contribution of Point Sources to Toxic Pollutant Loadings in Other California Bays (Toxic-Weighted)[1]

Pollutant	Nonurban Bays		Urban Bays		
	Monterey Bay	Humboldt Bay	San Diego Bay	Santa Monica Bay	San Pedro Bay
Arsenic	57.1%	32.7%	87.7%	89.9%	87.4%
Cadmium	83.8%	40.2%	100.0%	100.0%	100.0%
Chromium	15.2%	34.8%	95.2%	88.4%	87.8%
Copper	16.1%	17.0%	86.8%	89.4%	78.7%
Lead	29.9%	19.4%	41.0%	66.7%	26.9%
Mercury	75.6%	8.7%	90.1%	87.9%	81.3%
Zinc	23.7%	27.0%	80.9%	78.2%	70.6%
Chlorinated hydrocarbon pesticides	N/A	N/A	93.0%	99.1%	94.0%
Toxic-Weighted Average	**22.2%**	**33.1%**	**91.1-92.0%***	**87.9-93.3%***	**82.6-88.5%***

[1] Toxic-weighting based on loadings from NOAA, 1981-1984 (nonurban bays) and NOAA, 1988b and 1988c (urban bays). NOAA assessed the following point sources: POTWs, industrial effluents, and power plant effluent. NOAA assessed the following nonpoint sources: urban runoff, cropland runoff, forestland runoff, rangeland runoff, irrigation return flows, and upstream sources.

* Lower bound of range based on median toxic weight for pesticides (100); upper bound of range based on mean toxic weight for pesticides (5,300).

Source: U.S. EPA (1997).

EPA developed toxicity-weighted averages across the pollutants evaluated to reflect the contribution of point sources to each bay. The data showed point sources account for 23.2% and 33.1% of loadings in the nonurban bays (Monterey and Humboldt Bays, respectively), and 91.1%, 87.9%, and 82.6% in the urban bays (San Diego, Santa Monica, and San Pedro Bays, respectively).

In addition, for this revised analysis, EPA combined additional data for the Santa Monica Bay watershed (California Regional Water Quality Control Board, 1997) for seven pollutants with the NOAA data. These new data suggest that point source loadings of copper, lead, and zinc decreased between 1986 and 1992 and that, currently, nonpoint sources are the predominant

[3] Only two of these bays (San Diego and Humboldt) are enclosed bays covered by the rule. EPA assumed that the data for the non-enclosed bays generally will be applicable to enclosed bays.

contributors of lead and zinc (California Regional Water Quality Control Board, 1997)[4]. However, this additional data for copper, lead, and zinc does not change the toxic-weighted average for Santa Monica Bay. This is because mercury and chromium VI have such high toxic weights (500 and 35.5, respectively) compared to the toxic weights for arsenic, cadmium, copper, lead, and zinc (4, 5.2, 0.47, 1.8, and 0.051, respectively). As a result, the overall toxic-weighted average is more closely linked to the point source contribution of mercury and chromium-VI and is not influenced by the new data for Santa Monica Bay.

In general, the available data indicated that urban bays tend to have a greater portion of toxic loadings originating from point sources than do nonurban bays. The data also reveal that the contribution of point sources is much higher in the San Diego, Santa Monica, and San Pedro urban bays than EPA estimated for the urban San Francisco Bay. The reason for this discrepancy is not readily apparent. For urban bays, EPA averaged the mean toxic-weighted point source contributions for the three urban bays as well as the midpoint of the range of point source contribution for San Francisco Bay [(91.1 + 87.9 + 82.6 + 5.0)/4 = 66.7] to estimate that point sources account for 67% of toxic-weighted loadings to urban bays. EPA estimated that point sources account for 28% of toxic-weighted loadings to nonurban bays by averaging the mean toxic-weighted point source contributions for the two nonurban bays [(23.2 + 33.1)/2 = 28.2]. However, these percentages cannot be directly used to attribute benefits to the CTR because EPA was not able to estimate the proportion of benefits that occur in urban bays versus nonurban bays. Therefore, EPA developed a weighted average estimate of the point source contribution of toxic pollutant loadings to California bays and estuaries based on the population and land area around urban and nonurban bays.

Scaling by population implicitly assumes that benefits are proportional to the population living in different areas (e.g., that more fishing occurs in urban bays than nonurban bays) (U.S. EPA, 1997). EPA identified the relevant enclosed bays covered by the rule,[5] and obtained total population living within 10 miles of each bay.[6] The method yields an estimate of approximately 3.1 million people living near urban bays, and 275,000 people living near nonurban bays (U.S. EPA, 1997), and results in a population-weighted attribution estimate of 64%. To scale by land area surrounding the bays, EPA compiled data on total acreage of each of the urban and nonurban bays from California's WQA database (State Water Resources Control Board, 1994) (U.S. EPA, 1997). This approach yielded a land area-weighted average estimate of 42%. EPA used this

---

[4] The point source contributions for copper, lead, and zinc were 89.9%, 52.6%, and 75.1% respectively in 1986. In 1992, these contributions were 59.1%, 6.7%, and 40.4% (California Regional Water Quality Control Board, 1987).

[5] Urban bays include San Diego Bay, Mission Bay, Upper and Lower Newport Bay, and Los Angeles-Long Beach Harbor. Nonurban bays include Humboldt Bay, Bodega Harbor, Morro Bay, Drakes's Estero, Tomales Bay, and Carmel Bay (State Water Resources Control Board, 1991).

[6] Census tract-level population data were taken from the 1990 census and aggregated using geographic information system software.

42% to 64% range to attribute potential benefits of the implementation of the CTR in bays and estuaries. The limitations and uncertainties noted in Section 7.1 also apply to this estimated range.

7.3 FRESHWATER RESOURCES

Because of data and resource limitations, EPA could not assess the relative source contribution to specific freshwater resources in California. EPA used data for the Sacramento and San Joaquin rivers, and information on the influence of permitted mines on freshwaters, to develop a statewide estimate of the relative contribution of point sources to toxic pollutant loadings in freshwater. This estimate is based on data from the Central Valley RWQCB. The data include loadings from urban runoff, agricultural drainage, mining drainage, and industrial and municipal point sources. **Exhibit 7-3** shows the percentage of loadings attributable to point sources on each river.

Exhibit 7-3. Estimated Contribution of Point Sources to Toxic Pollutant Loadings in California Rivers (Toxic-Weighted)[1]

Pollutant	Sacramento River	San Joaquin River
Arsenic	22.3%	3.1%
Cadmium	81.6%	5.8%
Copper	72.4%	2.9%
Lead	6.1%	2.8%
Zinc	72.9%	7.2%

[1] Toxic-weighting based on loadings from Central Valley RWQCB, Mass Emission Strategy – Load Estimates.
Source: U.S. EPA (1997).

Because of the influence of permitted mine discharges on the Sacramento River, point source contributions for all pollutants are greater for the Sacramento River than for the San Joaquin River. Using a toxicity-weighted average across all five pollutants, EPA estimated that 46.3% of loadings to the Sacramento River and 3.4% of loadings to the San Joaquin River are associated with point sources.

EPA then used these estimates to develop a weighted-average contribution of point sources to toxic loadings in freshwater by using the estimate for the Sacramento River for river miles under the influence of major permitted mines and the estimate for the San Joaquin River for all other river miles. In California, there are five major mines that have NPDES permits, all of which are located in the Sacramento River watershed.[7] Therefore, EPA estimated that 0.001 percent of all lake acres and 0.05 percent of all river miles are under the influence of the five major NPDES permitted mines (Water Resources Control Board, 1996). Using the estimated point source

[7] A very small percentage of mines in California are permitted because most mines are inactive. EPA estimated river miles under the influence of mining for Lake Shasta (Alta Gold mine and Remedial Recovery), Sacramento River (Iron Mountain mine), South Feather River (Plumas Gold mine), and Pine Creek (U.S. Tungsten Corporation). This analysis does not account for multiple mines under a single permit.

contribution for the Sacramento River and the San Joaquin River, 46% and 30% respectively, EPA then calculated a weighted-average point source contribution of 3% for lakes and 3% for rivers.[8] The 3% for freshwater lakes also is applied to saline lakes.

EPA's analysis for freshwater also is subject to a number of uncertainties and limitations. First, the concentration of pollutants below the detection limit is not known. For this analysis, all samples below the detection limit were assumed to be zero. Second, only a subset of cities in the Central Valley region were incorporated in the estimate of urban runoff. Third, the use of effluent concentration data from the Sacramento County POTW may not be representative of effluent from other facilities. Finally, historic loadings in sediments may not be accounted for in the estimates.

7.4 SUMMARY

Exhibit 7-4 summarizes EPA's estimate of the relative contribution of point sources to total loadings of toxic pollutants in California waters. These estimates represent the toxic-weighted average across the pollutants evaluated. **Exhibit 7-5** summarizes the *key* uncertainties and limitations in the estimates. Because the direction and magnitude of biases generally is not known, it is difficult to assess their overall impact on the estimates.

[8] The calculation assumes a 46% point source contribution for mining impaired water bodies (0.001% of lakes and 0.05% of rivers) and a 3% contribution in other water bodies. The calculations are $0.46 \times (0.001\%) + 0.03 \times (1-0.001\%) = 3.00\%$; $0.46 \times (0.05\%) + 0.03 \times (1-0.05\%) = 3.02\%$.

Exhibit 7-4. Estimated Share of Total Toxic Pollutant Loadings Attributable to Point Sources for California Water Bodies

Water Body	Toxic Pollutant Loadings Attributable to Point Sources (%)
San Francisco Bay	1-10
Other bays and estuaries	42–64[1]
Freshwaters and saline lakes	3

[1] The lower-bound estimate is for nonurban bays and the upper-bound estimate is for urban bays.
Source: Based on EPA analysis of NOAA (1988a); NOAA (1988b); NOAA (1988c); Davis, et al. (1991); California RWQCB (1997); Central Valley RWQCB; and California 1994 WQA database, as originally presented in U.S. EPA (1997).

Exhibit 7-5. Key Uncertainties in the Analysis of Relative Point Source Contribution

Uncertainty	Relative Significance	Potential Direction of Bias on Point Source Contribution to Total Loadings		
		Overstate	Understate	Indeterminant
Generalized from limited loadings data for a small set of water bodies to the extensive system of salt and freshwater in California.	High			▯
Analysis based on a limited set of pollutants. Little information on pesticides. No information on PCBs, dioxin, and certain metals (e.g., silver).	High		▯	
"Historic" loadings not fully accounted for.	High	▯		
Studies used classify riverine inputs as nonpoint sources. Some of these loadings may have originated from point sources.	Medium		▯	
Point source contributions for San Francisco Bay are much lower than for the other urban bays.	Medium			▯

Source: Adapted from U.S. EPA (1997).

8.0 QUANTIFIED AND MONETIZED BENEFITS ESTIMATES

EPA quantified and monetized three categories of potential benefits from implementation of the CTR: (1) human health risk reductions, (2) recreational angling benefits, and (3) passive use values. These benefits estimates are presented in Sections 8.1 through 8.3. In addition, Section 8.4 describes potential categories of benefits that are expected to result from the rule but that EPA could not monetize. Section 8.5 provides a summary of the benefits estimates.

The analysis presented below resembles the analysis that accompanied the proposed CTR (the results have been updated to incorporate the revised estimates of pollutant loading reductions and a slight modification to how the reductions are incorporated). However, in response to comments on the proposed CTR and accompanying EA, EPA continued to search the literature for California-specific valuation research that may be relevant to estimating the benefits of the rule. Below, the results of three studies (Carson et al., 1994; Loomis et al., 1991; and Cooper and Loomis, 1991) are incorporated into this revised analysis. In addition, where possible, EPA updated the data underlying the analysis.

8.1 HUMAN HEALTH BENEFITS

EPA assessed the human health risks from the consumption of contaminated fish tissue, and the potential reductions in these risks expected to result from implementation of the CTR, for two populations of anglers: San Francisco Bay anglers and freshwater anglers in California.

San Francisco Bay represents one of the most important noncommercial fisheries among the bays and estuaries covered by the rule. EPA conducted the assessment for San Francisco Bay anglers as a case study example of the health risks for anglers fishing in enclosed bays and estuaries. In addition, the bay has been adversely affected by toxic pollution, as evidenced by a recently issued fish consumption advisory (FCA). This advisory is due to the concentrations of mercury, PCBs, dioxin, and pesticides in fish from the bay. Despite the issuance of the advisory in December 1994, the bay remains a popular area for anglers (U.S. EPA, 1997). However, because only two other health advisories have been issued for enclosed bays and estuaries in California, this case study may represent an upper-bound estimate of baseline health risks associated with enclosed bays and estuaries.

The freshwater resources in the state also have been adversely affected by toxic pollution. Fish consumption advisories have been issued for nine inland water bodies, including numerous reservoirs, rivers, and creeks in Santa Clara County and the Grassland Area of the Kesterson National Wildlife Refuge in Merced County. **Exhibit 8-1** summarizes the FCAs in place for inland waters and enclosed bays and estuaries in California. **Exhibit 8-2** illustrates the location of these FCAs, as well as the location of NPDES-permitted point source discharges and the density of resident fishing license sales by county.

Exhibit 8-1. Fish Consumption Health Advisories in California

Water Body/Location	Advisory for General Population		Advisory for Sensitive Populations[1]		Contaminants of Concern
	Avoid Consumption	Limit Consumption[2]	Avoid Consumption	Limit Consumption[2]	
Inland Surface Waters					
New River	All species		All species		Pesticides Biological contaminants
Clear Lake (Lake County)		1 lb per month ▯ Largemouth bass over 13" ▯ Channel catfish over 24" ▯ Crappie over 12" 2 lbs per month ▯ Largemouth bass under 13" 3 lbs per month ▯ Channel catfish under 24" ▯ Crappie under 12" ▯ White catfish 6 lbs per month ▯ Brown bullhead ▯ Sacramento blackfish 10 lbs per month ▯ Hitch	All species		Mercury
Lake Nacimiento (San Luis Obispo County)		4 meals per month ▯ Largemouth bass	Largemouth bass		Mercury
Lake Herman (Solano County)		1 lb per month ▯ Largemouth bass	Catfish		Mercury
Lake Berryessa (Napa County)		1 lb per month ▯ Largemouth bass over 15" ▯ Smallmouth bass 2 lbs per month ▯ Largemouth bass under 15" ▯ White catfish 3 lbs per month ▯ Channel catfish 10 lbs per month ▯ Rainbow trout	All fish		Mercury
Grassland Area Kesterson National Wildlife Refuge (Merced County)	Catfish	Max. of 4 oz. every 2 weeks ▯ All fish	All fish		Selenium
Salton Sea		Max. of 4 oz. every 2 weeks ▯ Croaker ▯ Sargo ▯ Tilapia ▯ Orangemouth corvina	All fish		Selenium
Bays and Estuaries[3]					
San Francisco Bay	Striped bass> 35"	Maximum of 2 meals per month ▯ All sport fish	Striped bass> 27" Shark> 24"	Maximum of 1 meal per month ▯ All sport fish	Mercury PCBs Dioxins Pesticides
Belmont Pier/Pier J (Los Angeles Harbor)		Maximum of 2 meals per month ▯ Surf perch			DDT, PCBs
Los Angeles/Long Beach Harbors (esp. Cabrillo Pier)	White croaker	Maximum of 2 meals per month ▯ Queenfish ▯ Surf perch ▯ Black croaker			DDT, PCBs

[1] California EPA defines sensitive populations as women who are pregnant, who may become pregnant, who are breast-feeding, and children under 6 years of age.
[2] California EPA defines a meal as 6 to 8 oz. (170 g to 227 g) of fish for a 154 lb (70 kg) individual. Meal size should be adjusted according to body weight (roughly 1 oz. of fish per 20 lbs of body weight).
[3] In addition to these advisories, California EPA has issued consumption warnings for the following ocean sites in Southern California that are not included within the scope of the California Toxics Rule: Newport Pier, Redondo Pier, Malibu Pier, Short Bank, Malibu/Point Dume, Point Vicente, Palos Verdes-Northwest, White's Point, Los Angeles/Long Beach Breakwater (ocean side), and Horseshoe Kelp. Detailed information on these advisories is available in the California Sport Fishing Regulations Handbook.
Source: U.S. EPA (1997).

EPA assessed baseline human health risks (cancer and systemic effects) based on reported contaminant levels in fish tissue samples collected from San Francisco Bay and freshwater fisheries throughout California. EPA then estimated the potential reduction in baseline risk levels that might result from implementation of the CTR. The approach used follows standard EPA methodology for estimating health risks as described in detail in U.S. EPA (1997).

8.1.1 Estimating the Exposed Population

EPA estimated the potentially exposed population for San Francisco Bay and for statewide freshwater resources based on information regarding recreational anglers. Consequently, this analysis does not include health risks to non-angler family members that consume fish obtained from recreational angling,[1] nor does it consider the benefits to individuals that consume commercially caught fish. EPA assumed that consumption of commercially caught fish from areas affected by implementation of the CTR would be small relative to the consumption of commercially caught fish from other locations. If there were consumption of substantial quantities of commercially caught fish from areas affected by the CTR, benefits would be underestimated.

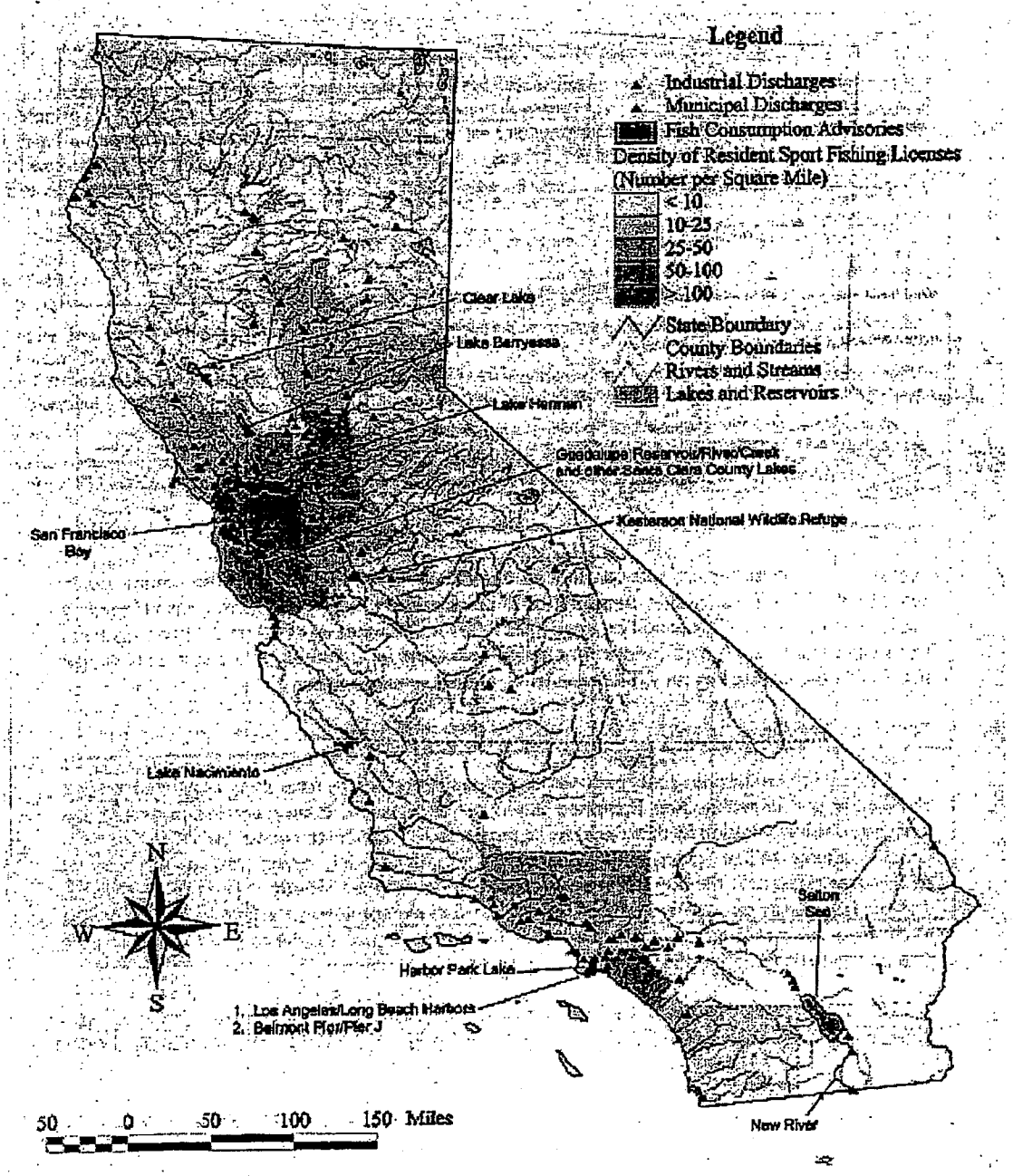
San Francisco Bay

EPA estimated the potentially exposed angler population for the case study based on the eight counties in the immediate San Francisco Bay area. A survey of fishing activity in central and northern California reported that there are approximately 332,000 saltwater anglers in the eight counties adjacent to San Francisco Bay, and the bay is the destination for approximately 50% of the trips taken near the bay (the area north of Stinson Beach to south of Davenport) (National Marine Fisheries Service, 1987). EPA assumed that one-half of the anglers fish exclusively in the bay and one-half fish exclusively at other Pacific Ocean sites. Applying this assumption, EPA estimated that there are 166,000 anglers using San Francisco Bay.

A portion of the estimated 166,000 saltwater anglers that use San Francisco Bay also may participate in freshwater angling. The 1996 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation (U.S. Department of Interior, Fish and Wildlife Service, and U.S. Department of Commerce, Bureau of the Census, 1998) indicates that 46% of the saltwater anglers (adults and children) in California fish exclusively in saltwater and 54% fish in both saltwater and freshwater. EPA assumed that anglers that split their time spend half of their time using each resource. Therefore, of the 166,000 anglers that use San Francisco Bay for saltwater angling, EPA estimated that 76,360 anglers fish exclusively in the Bay, and the other 89,640 split their time equally between the bay and freshwater resources. Thus, EPA estimated that approximately 121,000 full-time equivalent anglers use San Francisco Bay.

[1] Approximately 45% of anglers share the catch with family members (Save San Francisco Bay Association, 1995).

EXHIBIT 8-2: DENSITY OF FISHING LICENSES IN RELATION TO THE LOCATION OF POINT SOURCE DISCHARGERS IN CALIFORNIA



Because this estimate is based on data collected before the imposition of a FCA for San Francisco Bay, EPA adjusted the population down to account for behavioral responses of anglers to FCAs. Recent literature suggests that between 10% and 37% of anglers take fewer trips in response to FCAs (Fiore et al., 1989; Silverman 1990; Knuth et al., 1993; Knuth and Connelly, 1992; Vena, 1992; West et al., 1993). However, these anglers may not eliminate trip-taking. Therefore, EPA assumed that the FCA resulted in a 10% reduction in anglers using San Francisco Bay (This reduction was not likely to have been offset by population growth since resident fishing license sales in the eight counties adjacent to San Francisco Bay fell 22% between 1987 and 1994). EPA's adjusted estimate of full-time equivalent anglers for San Francisco Bay is 108,900.

Freshwater Resources

EPA used the 1996 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation (U.S. Department of Interior, Fish and Wildlife Service, and U.S. Department of Commerce, Bureau of the Census, 1998) and license sales reported by the California Department of Fish and Game for 1996 to estimate the number of freshwater anglers in California. The survey indicated that there were 2.7-million resident anglers in California, including adults and children. Sixty-three percent of the adult anglers fish exclusively in freshwater, 20% split their angling activity between fresh and saltwater, and the remaining 17% of anglers fish exclusively in saltwater. Assuming that children apportion their angling time in the same way as adults, EPA estimated that 1.7-million anglers fish exclusively in freshwater, and 551,000 split their time between fresh and saltwater resources. EPA assumed that anglers that split their time spend half of their time using each resource. Based on this information, EPA calculated that nearly 2-million full-time equivalent anglers use freshwater resources in California.

EPA reduced this estimate of freshwater anglers by the number of 1-day license sales in 1996 (329,730) to remove infrequent anglers from the estimate of potentially exposed anglers. This calculation uses the proportions for total angling time to apportion the number of 1-day licenses between salt and freshwater resources. Using this approach, EPA estimated a potentially exposed population of 1.7 million full-time equivalent anglers using freshwater resources in California.

8.1.2 Fish Consumption

EPA estimated fish consumption rates for both San Francisco Bay and freshwater anglers using the Santa Monica Bay Seafood Consumption Study (MBC Applied Environmental Services, 1994). For this study, the Santa Monica Bay Restoration project conducted a survey of 554 anglers fishing from beaches, piers, private boats, party boats, and charter boats to determine the level and nature of sport-caught fish consumption. This study reported a median consumption rate of 21.4 g/day and a 90th percentile consumption rate of 107.1 g/day for consuming anglers. Although these estimates were developed by interviewing only consuming anglers, EPA applied them to total anglers because they are supported by fish consumption rates for all anglers

(**Exhibit 8-3**). To the extent that the study does not accurately characterize the fish consumption of anglers using freshwater resources, it will lead to an overestimate or under estimate of risks.

Exhibit 8-3. Consumption Rates for Recreational Anglers

Study	Type of Fishery	Angler Population	Consumption Rate
U.S. EPA, 1989a	Sport-caught fish, nationally	All anglers	20 g/day
Puffer et al., 1981	Sport-caught fish from Los Angeles Bay, CA	Anglers who had creeled fish	37 g/day
MBC Applied Environmental Services, 1994	Sport-caught fish from Santa Monica Bay, CA	Anglers who consume fish	21 g/day

Source: U.S. EPA (1997).

8.1.3 Fish Tissue Contaminant Concentrations

EPA used available data (see U.S. EPA, 1997, Appendix F) to calculate the arithmetic mean of fish tissue contaminant concentrations for San Francisco Bay and for statewide freshwater resources. To determine the concentrations, EPA used one-half the MDL for samples in which contaminants were reported as non-detects (U.S. EPA, 1993).

San Francisco Bay

EPA obtained fish tissue contaminant levels from a 1994 study conducted by the San Francisco Regional Water Quality Control Board (SFRWQCB). The study included fish tissue samples from 16 sampling locations selected to provide a broad geographic coverage of the bay. The sampling survey (SFRWQCB, 1994) included fillets of white croaker, striped bass, perch, and shark. The fish tissue samples were prepared for chemical analysis according to the most common means of consumption (croaker and surf perch fillets with skin, and shark and striped bass without skin).

EPA relied on catch rates reported in the National Marine Fisheries Service Marine Recreational Fishing Statistics Survey of the Pacific Coast (1987, 1988, 1989, and 1993) (**Exhibit 8-4**) to develop species-weighted fish tissue contaminant concentrations for San Francisco Bay. The species consumption weighting factors are used to allocate the amount of fish consumed in proportion to anglers' exposure to individual fish species. EPA assumed that keep rates are comparable across the four species in the analysis. This approach was used for both San Francisco Bay and freshwater, but may not accurately reflect species-weighted fish tissue contaminant concentrations because the approach is based on the number of fish caught rather than the mass of edible fish tissue. In addition, fish tissue contaminant data for jacksmelt, a frequently caught species, was not available. However, the relatively small degree of variation in risks associated with consuming the four species that were included in the analysis suggests that the lack of data on mass consumed is unlikely to significantly overestimate or underestimate bay angler risks (U.S. EPA, 1997).

Exhibit 8-4. Species Weights for San Francisco Bay Fish Consumption

Species	Number of Fish Caught	Consumption Weighting Factors[3]
White croaker	532	43.1%
Surf perch[1]	432	35.0%
Striped bass	171	13.9%
Shark[2]	99	8.0%
Total	1,234	100.0%

[1] Includes shiner, walleye, pile, black, and rubberlip surf perch.
[2] Includes brown, smoothhound, and leopard shark.
[3] Represents the percentage of the total catch for each species. Keep rates are assumed to be comparable for the four species.
Source: National Marine Fisheries Service Marine Recreational Fishing Statistics Survey, Pacific Coast, 1987–1989 and 1993, as cited in U.S. EPA (1997).

Freshwater Resources

EPA obtained fish tissue contaminant concentration data from samples taken between 1988 and 1993 by the California Toxic Substances Monitoring Program. Despite the wide representation of freshwater bodies (224 sampling locations for metals and 170 for organics), this database may not be representative of all freshwater bodies. Sampling under this program has generally been targeted to water bodies with known or suspected water quality impairments. The sampling survey included samples of 32 different freshwater fish species, which EPA combined into five broad groups: trout, bass, catfish, panfish, and other. EPA developed species-weighted fish tissue contaminant concentrations from estimates of fishing activity and keep rates by species (**Exhibit 8-5**). The species consumption weighting factors are used to allocate the amount of fish consumed in proportion to anglers' exposures to individual fish species.

Exhibit 8-5. Species Weights for Freshwater Fish Consumption

Species	Annual Fishing Activity[1] (number of days)	Keep Rate[2]	Keep-Rate Weighted Days[3]	Consumption-Weighting Factors[4]
Trout	16,292	25%	2,660	28.0%
Bass	10,431	25%	1,541	16.2%
Catfish	3,972	80%	3,278	34.6%
Panfish	1,457	90%	1,679	17.7%
Other	5,455	25%	329	3.5%
Total	**28,987[5]**	—	**9,487**	**100.0%**

[1] Source: U.S. Department of Interior, Fish and Wildlife Service, and U.S. Department of Commerce, Bureau of the Census, 1998.
[2] Source: California Department of Fish and Game (1995). Keep rates for bass and trout were 20% to 25%. For purposes of this analysis EPA assumed that the keep rates for bass, trout, and "other" species were 25% (Dennis Lee, California Department of Fish and Game, personal communication, August 1995).
[3] Calculated by multiplying the annual fishing activity days for each species by the keep-rate for that species. The total keep-rate weighted days is a sum of the keep-rate weighted days for all species.
[4] Calculated by dividing the keep-rate weighted days for each species by the total keep-rate weighted days.
[5] Represents total number of fishing days per year. Does not equal the sum of individual species days because more than one species may have been caught during a single fishing day.

8.1.4 Baseline Risk Levels

EPA calculated exposure based on the assumption that each fish contained all contaminants listed at the concentrations shown in U.S. EPA (1997). **Exhibit 8-6** reports the assumed toxicity values for cancer and systemic effects. EPA used standard assumptions regarding length of residence, 70 years, and body weight, 70 kg (U.S. EPA, 1989b).

Exhibit 8-6. Toxicity Values and Contaminants Evaluated in Each Analysis

Contaminant	CSF[1] $(mg/kg\text{-}day)^{-1}$	RfD[1] (mg/kg-day)	San Francisco Bay	Freshwater Resources
Cadmium	NA	1.0×10^{-3}	▯	
Chlordane	1.3	6.0×10^{-5}	▯	▯
Copper	NA	3.7×10^{-2}	▯	▯
4,4-DDT	0.34	5.0×10^{-4}	▯	▯
Dieldrin	16.0	5.0×10^{-5}	▯	▯
Dioxin	1.50×10^{5}	NA	▯	
Endosulfan	NA	6.0×10^{-3}		▯
Endrin	NA	3.0×10^{-4}		▯
Fluoranthene	NA	4.0×10^{-2}	▯	
Fluorene	NA	4.0×10^{-2}	▯	
HCH-alpha	6.3	NA	▯	▯
HCH-beta	1.8	NA	▯	
HCH-gamma	1.3	3.0×10^{-4}	▯	▯
Heptachlor Epoxide	9.1	1.3×10^{-5}	▯	
Heptachlor	4.5	5.0×10^{-4}	▯	
Hexachlorobenzene	1.6	8.0×10^{-4}	▯	▯
Mercury	NA	1.0×10^{-4}	▯	▯
Nickel	NA	2.0×10^{-2}		▯
PCBs[2]	2.0	2.0×10^{-5}	▯	▯
Pyrene	NA	3.0×10^{-2}	▯	
Selenium	NA	5.0×10^{-3}		▯
Silver	NA	5.0×10^{-3}	▯	
Toxaphene	1.1	NA		▯
Zinc	NA	3.0×10^{-1}	▯	▯

[1] CSF = cancer slope factor; RfD = reference dose. Toxicity values obtained from U.S. EPA's Integrated Risk Information System (4th Quarter, 1996), except for the HCH-gamma and dioxin CSFs and the copper RfD, which were obtained from U.S. EPA's Health Effects Assessment Summary Table, 1994.

[2] The CSF is based on EPA's revised October 1,1996, guidance for assessment of carcinogenic human health risks associated with PCB exposure.

NA = Not applicable

Source: U.S. EPA (1997).

San Francisco Bay

Exhibit 8-7 presents estimates of baseline cancer risks for San Francisco Bay anglers. EPA estimated that the individual excess lifetime cancer risk for anglers consuming a mixed species diet at an average consumption rate is 1.8×10^{-4} and statistical excess cancer cases per year at baseline are less than 1. (Potential benefits of the CTR are calculated for the average consumption rate.) However, for anglers consuming at the 90th percentile consumption rate, the individual excess lifetime cancer risk is 9.2×10^{-4}. These risks are dominated by PCBs and dioxin, which contribute 49% and 41%, respectively, to the cancer risk for an average angler.[2]

Exhibit 8-7. Baseline Cancer Risks for Recreational Anglers Consuming San Francisco Bay Fish

Contaminant	Individual Excess Lifetime Cancer Risk		Population Cancer Risk[1] (excess cases per year)	Relative Contribution to Risk
	Average Consumption (21.4 g/day)	90th Percentile Consumption (107.1 g/day)		
PCBs[2]	9.0×10^{-05}	4.5×10^{-04}	<1	49.0%
Dioxin	7.6×10^{-05}	3.8×10^{-04}	<1	41.2%
Dieldrin	7.8×10^{-06}	3.9×10^{-05}	0	4.2%
4,4-DDT	4.9×10^{-06}	2.4×10^{-05}	0	2.6%
Chlordane	3.9×10^{-06}	2.0×10^{-05}	0	2.1%
HCH-alpha	4.8×10^{-07}	2.4×10^{-06}	0	0.3%
Heptachlor Epoxide	3.8×10^{-07}	1.9×10^{-06}	0	0.2%
HCH-beta	1.7×10^{-07}	8.5×10^{-07}	0	0.1%
Heptachlor	1.6×10^{-07}	7.7×10^{-07}	0	0.1%
HCH-gamma	9.2×10^{-08}	4.6×10^{-07}	0	<0.1%
Hexachlorobenzene	8.1×10^{-08}	4.1×10^{-07}	0	<0.1%
Total	**1.8×10^{-04}**	**9.2×10^{-04}**	**<1**	**100.0%**

[1] Based on average fish consumption (21.4 g/day).
[2] Risk is based on an estimated concentration of PCBs in fish tissue that appears to be calculated by summing Aroclor congeners for 1248, 1254, and 1260. This may result in overstating baseline risks.
Source: U.S. EPA (1997).

Systemic (noncancer) risks are assessed by means of a hazard quotient (HQ) for each contaminant. The HQ is calculated by dividing the expected exposure level (dose) by the oral reference dose (RfD), where the oral RfD indicates the level of chronic exposure below which no adverse health effects are expected. Therefore, a HQ of 1.0 or greater implies that chronic

[2] Risk based on full-time equivalent anglers. Individual baseline risks may be lower by a factor of two for anglers that spend a portion of their time fishing in less-contaminated waters such as anglers that split their fishing activity between saltwater and freshwater, as discussed in Section 8.1.1.

chemical exposures exceed EPA-established "thresholds" of toxicity, and is indicative of potential for adverse health effects. The potential for detrimental health effects increases as the HQ increases above 1.0.

Exhibit 8-8 presents estimated baseline systemic risks for San Francisco Bay anglers. EPA estimated that the HQ for PCBs is 2.3. For anglers with high consumption rates (90th percentile), EPA estimated that the HQs for PCBs, mercury, and dioxin are 11.3, 3.8, and 2.5, respectively.[3]

Exhibit 8-8. Baseline Systemic Risks for Recreational Anglers Consuming San Francisco Bay Fish

Contaminant	Hazard Quotient[1]	
	Average Consumption (21.4 g/day)	90th Percentile Consumption (107.1 g/day)
PCBs	**2.26**	**11.31**
Mercury	0.75	**3.77**
Dioxin	0.51	**2.54**
Chlordane	0.05	0.25
4,4-DDT	0.03	0.14
Dieldrin	0.01	0.05
Zinc	0.01	0.04
Heptachlor Epoxide	<0.01	0.02
Copper	<0.01	0.01
Cadmium	<0.01	<0.01
HCH-gamma	<0.01	<0.01
Silver	<0.01	<0.01
Heptachlor	<0.01	<0.01
Hexachlorobenzene	<0.01	<0.01
Fluoranthene	<0.01	<0.01
Pyrene	<0.01	<0.01
Fluorene	<0.01	<0.01

[1] Hazard quotients above one shown in bold.
Source: U.S. EPA (1997).

Freshwater Resources

Exhibit 8-9 presents estimated baseline cancer risks for California freshwater anglers. EPA estimated that the individual excess lifetime cancer risk at baseline for anglers consuming a mixed species diet at an average consumption rate is 1.5×10^{-4} and there are less than four baseline excess statistical cancer cases per year. For anglers consuming a mixed species fish diet at the 90th percentile consumption rate, EPA estimated that the individual excess lifetime cancer

[3] Risk based on full-time equivalent anglers. The baseline HQ for all contaminants except mercury are estimated to be less than one for anglers that spend a portion of their time fishing in less contaminated waters.

risk is 7.6×10^{-04}. These risks are dominated by PCBs, toxaphene, 4,4-DDT, and dieldrin, which contribute 37%, 21%, 17%, and 16%, respectively, of the cancer risk for an average angler.

Exhibit 8-9. Baseline Cancer Risks for Recreational Anglers Consuming Freshwater Fish in California

Contaminant	Individual Excess Lifetime Cancer Risk		Population Cancer Risk[1] (excess cases per year)	Relative Contribution to Risk
	Average Consumption (21.4 g/day)	90th Percentile Consumption (107.1 g/day)		
PCBs	5.6×10^{-05}	2.8×10^{-04}	2	37.0%
Toxaphene	3.2×10^{-05}	1.6×10^{-04}	1	21.2%
4,4-DDT	2.5×10^{-05}	1.3×10^{-04}	1	16.6%
Dieldrin	2.4×10^{-05}	1.2×10^{-04}	1	16.0%
Chlordane	1.1×10^{-05}	5.3×10^{-05}	<1	7.0%
HCH-alpha	2.0×10^{-06}	1.0×10^{-05}	<1	1.3%
Hexachlorobenzene	1.0×10^{-06}	5.1×10^{-06}	<1	0.7%
HCH-gamma	4.6×10^{-07}	2.3×10^{-06}	<1	0.3%
Total	**1.5×10^{-04}**	**7.6×10^{-04}**	**5**	**100.0%**

[1] Based on average fish consumption (21.4 g/day).
Source: U.S. EPA (1997).

Exhibit 8-10 presents the potential baseline systemic risks for California freshwater anglers. EPA estimated that the baseline HQ for PCBs is 1.4. For anglers with high consumption rates (90th percentile), EPA estimated that the baseline HQs for PCBs and mercury are 7.0 and 3.1, respectively.

8.1.5 Potential Risk Reductions Attributable to the Rule

To estimate the potential risk reductions attributable to the CTR, EPA assumed that fish tissue contaminant concentrations would be reduced by the expected reduction in loadings multiplied by the assumed contribution of point sources to total loadings developed in Chapter 7 (**Exhibit 8-11**). As shown in Chapter 4, EPA developed two scenarios of potential baseline pollutant loadings and reductions in loadings attributable to the rule. These scenarios reflect the uncertainty underlying the analysis of potential costs to point source dischargers that results from limited data on the presence of toxic pollutants in the effluents below detectable levels.

Exhibit 8-10. Baseline Systemic Risks for Recreational Anglers Consuming Freshwater Fish in California

Contaminant	Hazard Quotient[1]	
	Average Consumption (21.4 g/day)	90th Percentile Consumption (107.1 g/day)
PCBs	**1.40**	**7.02**
Mercury	0.62	**3.12**
4,4-DDT	0.15	0.74
Chlordane	0.14	0.68
Dieldrin	0.03	0.15
Selenium	0.02	0.12
Endrin	0.01	0.04
Endosulfan	<0.01	0.02
Zinc	<0.01	0.02
Copper	<0.01	0.01
HCH-gamma	<0.01	0.01
Nickel	<0.01	0.01
Hexachlorobenzene	<0.01	<0.01

[1] Hazard quotients above one shown in bold.
Source: U.S. EPA (1997).

In the first scenario (the low cost scenario), EPA estimated baseline pollutant loadings of 1.8 million pounds per year and a reduction of 20.6% of this baseline resulting from the CTR. On a toxicity-weighted basis, this represents baseline loadings of 2.2 million pounds-equivalent per year and a reduction of 49.6%. Under the second scenario (the high cost scenario), EPA estimated baseline pollutant loadings of 153.9 million pounds per year and a reduction of 28.4% from this baseline resulting from the CTR. On a toxicity-weighted basis, this represents baseline loadings of 18.5 million pounds-equivalent per year and a reduction of 14.7%.

The two scenarios reflect use of different assumptions regarding whether pollutants are present in the effluent of point source dischargers with the high cost scenario using permit limits to establish the presence of pollutants (and not actual effluent monitoring data). Thus, the high cost scenario establishes a larger baseline loading of toxic pollutants from point sources compared to the low cost scenario. The high cost scenario also indicates a smaller percentage reduction as a result of the CTR although this increment is larger in absolute terms compared to that resulting under the low cost scenario.

Because of the uncertainty in the analysis of baseline pollutant loadings, EPA used the midpoint between the reductions estimated under the low and high cost scenarios for estimating potential benefits. For human health risk reduction benefits, this is implemented simply as the midpoint between the low and high cost scenario results for each pollutant analyzed (the percentage reductions are the same on an unweighted or toxicity-weighted basis).

Exhibit 8-11. Estimated Reduction in Fish Tissue Contaminant Concentrations Due to Implementation of the CTR

Contaminant	Statewide Reductions in Loadings[1] (%)	Reduction in Fish Tissue Concentration (%)	
		San Francisco Bay[2]	Freshwater Resources[3]
Cadmium	0.2	0	ne
Chlordane	0	0	0
Copper	14.9	0.1 - 1.5	0.4
4,4-DDT	0	0	0
Dieldrin	0	0	0
Dioxin	0	0	ne
Endosulfan	0	ne	0
Endrin	0	ne	0
Fluoranthene	0	0	ne
Fluorene	0	0	ne
HCH-alpha	0	0	0
HCH-beta	0	0	ne
HCH-gamma	25.2	0.3 - 2.5	0.8
Heptachlor Epoxide	0	0	ne
Heptachlor	0	0	ne
Hexachlorobenzene	48.1	0.5 - 4.8	1.4
Mercury	70.3	0.7 - 7.0	2.1
Nickel	9.2	ne	0.3
PCBs	25.9	0.3 - 2.6	0.8
Selenium	0	ne	0
Silver	38.5	0.4 - 3.9	ne
Toxaphene	1.0	ne	0
Zinc	2.4	0 - 0.2	0.1

[1] Represents the midpoint of the low and high cost scenario results.
[2] Calculated by multiplying the percent reduction in point source loading by the estimated point source contribution to total loadings (1%-10%)
[3] Calculated by multiplying the percent reduction in point source loading by the estimated point source contribution to total loadings (3%).
ne= Not evaluated

Exhibits 8-12 and **8-13** present the potential reductions in cancer risks for recreational anglers. EPA estimated reductions in statistical cancer cases for anglers with average consumption rates. Using an estimated value of a statistical life of $2.5 million to $9.0 million (American Lung Association, 1995) updated to first quarter 1998 dollars[4] and assuming all cancers are fatal,

[4] 1995 dollars were updated to first quarter 1998 dollars using the Consumer Price Index (CPI) as reported in the U.S. Department of Labor (U.S. Bureau of Labor Statistics, 1998). Note that there is currently a debate regarding the accuracy of the CPI.

potential human health benefits of reduced cancer cases in recreational anglers range from $0.10 million to $4.20 million per year[5].

Exhibit 8-12. Potential Effect of Implementation of the CTR on Cancer Risks for Recreational Anglers

Contaminant	Baseline Individual Excess Lifetime Cancer Risk		Post-CTR Individual Excess Lifetime Cancer Risk[1]	
	Average Consumption (21.4 g/day)	90th Percentile Consumption (107.1 g/day)	Average Consumption (21.4 g/day)	90th Percentile Consumption (107.1 g/day)
San Francisco Bay				
Total[2]	1.84×10^{-4}	9.20×10^{-4}	1.54×10^{-4} – 1.60×10^{-4}	7.69×10^{-4} – 7.99×10^{-4}
Freshwater Resources				
Total[3]	1.51×10^{-4}	7.60×10^{-4}	1.34×10^{-4}	6.72×10^{-4}

[1] Range based on estimate of reductions in fish tissue concentration contamination (based on projected point source load reductions and the contribution of point sources to total loading).
[2] Total for 11 contaminants listed in Exhibit 8-7.
[3] Total for 8 contaminants listed in Exhibit 8-9.

Exhibit 8-13. Potential Human Health Benefits of Reducing Cancer After Implementation of the CTR to Recreational Anglers[1]

Water Body	Annual Reduction in Cancer Cases	Annual Monetized Benefits (millions of 1998 dollars)[1,2]
San Francisco Bay	0.04 - 0.05	$0.10 - $0.45
Freshwater Resources	0.44	$1.17 - $4.20

[1] Based on an average consumption rate (21.4 g/day) and a value of a statistical life of $2.5 million to $9.0 million (American Lung Association, 1995). Values based on the estimates of reductions in fish tissue concentration contamination.
[2] Estimates are adjusted from 1995 dollars to first quarter 1998 dollars using the Consumer Price Index (CPI) as reported in the U.S. Department of Labor (U.S. Bureau of Labor Statistics, 1998). Note that there is currently a debate regarding the accuracy of the CPI.

Exhibit 8-14 presents the potential effect of the CTR on systemic risks for recreational anglers, indicating potential reductions in the hazard quotients for PCBs and mercury. For PCBs, EPA expects the hazard quotient associated with the average consumption rate to be reduced from 2.26 to a range of 1.51-1.66 for San Francisco Bay anglers and from 1.40 to 1.01 for freshwater anglers. However, for the high consumption rate (90th percentile), the HQ for PCBs is expected to be reduced from 11.31 to a range of 7.54-8.29 for San Francisco Bay anglers and from 7.02 to 5.04 for freshwater anglers.

EPA estimated that the HQ for mercury will be reduced for both the average and 90th percentile consumption rates, however baseline levels exceed 1.0 for high consumers only. For high fish consumers (90th percentile), EPA expects the HQ for mercury to be reduced from 3.77 to a range of 1.01-1.11 for San Francisco Bay anglers and from 3.12 to 0.90 for freshwater anglers.

[5] Based on the following calculation: (estimated value of a life) x (CPI factor) x (reduction in cancer cases); e.g., $2.5 million x 1.062 x 0.04 = $0.1 million.

Exhibit 8-14. Potential Effect of Implementation of the CTR on Systemic Risks for Recreational Anglers

Contaminant	Baseline Hazard Quotient[1]		Post-CTR Hazard Quotient[1,2]	
	Average Consumption (21.4 g/day)	90th Percentile Consumption (107.1 g/day)	Average Consumption (21.4 g/day)	90th Percentile Consumption (107.1 g/day)
San Francisco Bay				
PCBs	**2.26**	**11.31**	**1.51 - 1.66**	**7.54 - 8.29**
Mercury	0.75	**3.77**	0.20 - 0.22	**1.01 - 1.11**
Dioxin	0.51	**2.54**	0.51 - 0.51	**2.54 - 2.54**
Freshwater Resources				
PCBs	**1.40**	**7.02**	**1.01**	**5.04**
Mercury	0.62	**3.12**	0.18	0.90

[1] Hazard quotients above one shown in bold.
[2] Range based on estimates of reductions in fish tissue concentration contamination.

8.1.6 Uncertainties and Limitations

As described in U.S. EPA (1997), there are numerous uncertainties associated with the assessment of potential human health risks including the following:

Risks were based on contaminant concentrations found in fish fillets or fish prepared by the most common method for the species (croaker and surf perch fillets with skin, and shark and striped bass without skin). Anglers that consume other body parts or untrimmed fillets (including the skin) face higher risks. The Santa Monica Bay Seafood Consumption Study (MBC Applied Environmental Services, 1994) reported that one-third of all anglers eat fish whole, but gutted, including nearly 50% of Asians and 44% of Hispanics.

Risks were based on tissue contaminant levels measured in raw fish fillets. One study (OEHHA, 1991) found that 4,4-DDT concentrations may decrease by 20% to 80% after cooking (U.S. EPA, 1997).

The assessment does not include potential health risks associated with inorganic arsenic. Arsenic in edible fish tissue is, in almost all cases, present as arsenic-containing organic compounds that are not considered a threat to human health. However, where small amounts of inorganic arsenic are present in edible fish tissue, the analysis will understate potential risks.

Average fish tissue concentrations used in the assessment are calculated using one-half of the MDL for all contaminants reported at below the analytical detection level (but found present in other fish tissue samples taken from the same site).

The risk assessment did not include a separate analysis for low-income anglers. MBC Applied Environmental Services (1994) reported a median fish consumption of 32.1 g/day for anglers with incomes below $5,000, compared to 21.4 g/day for all anglers. Results at the 90th percentile consumption rate included in this analysis covers people consuming higher than average consumption.

Risk reduction based on extrapolation of loadings reduction from sample facilities may overstate or understate actual loadings reduction and actual risk reduction.

The assessment does not account for potential synergistic effects of mixtures of pollutants in fish tissue.

8.2 RECREATIONAL ANGLING BENEFITS

The above section described the potential human health benefits that may result from implementation of the CTR. Concerns regarding adverse health effects from eating contaminated fish also may reduce the value of the recreational fishery because the ability to consume fish may be an important attribute of the overall fishing experience (Knuth and Connelly, 1992; Vena, 1992; FIMS and FAA, 1993; West et al., 1993). This reduction in value may occur because fewer fishing trips are taken or because the value of a trip is reduced. In addition, as described in Chapter 6, reduced toxic contamination may increase stability, resilience, and overall health of numerous ecosystems, which may increase catch rates as well as angling effort in California. Thus, the potential recreational benefits of the CTR may include an increase in the value of fishing experiences and an increase in participation.

This section provides estimates of these two components of recreational angling value. Because the analysis is conducted at the statewide level and does not consider numerous site-specific characteristics that will affect the level of benefits from the rule, the results are only intended to provide a rough approximation of the potential magnitude of recreational benefits. A case study approach would be required to more accurately characterize the anticipated angling benefits at any specific water body in California.

8.2.1 Value of an Improved Fishing Experience

As described previously, toxic contamination is responsible for 12 fish consumption advisories currently in place throughout the state, including advisories for 4,4-DDT, chlordane, dioxin, mercury, PCBs, and selenium (see Exhibit 8-1). These advisories, and knowledge of toxic contamination in other water bodies, may affect anglers' enjoyment of the fishing experience. EPA estimated reductions in mercury and other toxic contaminants in California surface waters as a result of implementation of the CTR. Thus, the rule may reduce concentrations of toxics in fish tissue, increasing value to recreational anglers.

EPA was unable to identify any studies regarding the value to California anglers of reducing toxic contamination of surface waters. However, a 1992 study of the Wisconsin Great Lakes

open water sport fishing (Lyke, 1993) does reveal the significance of the contamination problem to the anglers. Lyke estimated the value of the Great Lakes trout and salmon fishing to anglers if it were "completely free of contaminants that may threaten human health." Lyke's estimates indicate benefits of 11% to 31% of the value of the fishery.

Lyke's work estimated the value of reducing toxic contamination in a popular boat fishery that has experienced widespread and highly publicized historical contamination and fish consumption advisories. Thus, the study results may be less applicable for many California anglers because, for example, the fish consumption advisory for San Francisco Bay was issued in 1994 and the fishing experience at many freshwater rivers and streams may differ significantly from Great Lakes trout and salmon angling. However, rather than leave an important category of potential benefits unmonetized, EPA transferred the results from the Lyke study to estimate potential recreational angling benefits of the CTR in California. EPA also considered what the research might indicate about potential benefits for all California waters affected by toxics, not just those waters under fish consumption advisories.[6]

To transfer the Lyke results, EPA first estimated the number of fishing days in California that occur in toxic-impaired waters, distinguishing between water body type (e.g., freshwater river versus saltwater). Next, EPA multiplied the number of fishing days by an average consumer surplus for the different modes of fishing to obtain a baseline value of the fishery. EPA then multiplied by Lyke's estimate of 11% to 31% to obtain the value of a "contaminant-free" fishery. Finally, EPA multiplied by the expected reduction in loadings and the assumed contribution of point sources to total loadings (developed in Chapter 7) to obtain the portion of these benefits that may be potentially attributable to point source controls. These steps are described below.

Estimating Toxic-Impaired Fishing Days

EPA developed estimates of the number of fishing days in freshwater and saltwater sources in California based on information from several sources (National Marine Fisheries Service, 1987–1989 and 1993, Huppert, 1989; U.S. Fish and Wildlife Service, 1993; EPA, 1997). EPA then analyzed the extent of toxic impairment of California waters based primarily on the State of California's WQA database (Water Resources Control Board, 1994) as described in U.S. EPA (1997) and used this information to calculate "toxic-impaired" fishing days. This approach assumes that anglers have not substituted away from contaminated waters.

It also should be noted that EPA defined "impaired" waters as those monitored and rated by the State of California as having medium or poor quality for at least one toxic pollutant or group of

[6] Transferring the Lyke (1993) research to all California waters affected by toxics, but not posing human health risk as indicated by fish consumption advisories, may overstate potential benefits.

toxic pollutants.[7] The State of California has monitored 9% of river and stream miles; 54% of lake and reservoir acreage; and an unknown percentage of bays, estuaries, and saline lakes (U.S. EPA, 1997). Of these monitored waters, the state found that 19% of river and stream miles, 19% of lake and reservoir acreage, 69% of San Francisco Bay, 51% of other California bays, 47% of estuaries, and 69% of saline lakes are "impaired" (U.S. EPA, 1997). EPA assumed for this analysis, maybe conservatively, that California has monitored 50% of bays, estuaries, and saline lakes and then that 50% of unmonitored waters were impaired similarly to monitored waters.[8] To the extent that a substantially greater proportion of waters that have not been monitored are impaired, benefits will be underestimated.

As shown in **Exhibit 8-15**, multiplying the estimated number of fishing days by the percent of monitored waters that are impaired yields estimates of the number of toxic-affected fishing days. EPA estimated a total of 6.4-million fishing days in toxic-impaired waters in California, of which 3.7 million are associated with freshwater fishing and 2.7 million are associated with saltwater fishing.

Exhibit 8-15. Baseline Fishing Days Occurring in Toxic-Impaired Waters[1] in California

	Fishing Days per Year[2]	Percent of Assessed Waters Toxic-Impaired[1,2]	Toxic-Affected Fishing Days[3]
Freshwater Fishing			
Lakes, reservoirs, and ponds	17,826,000	15%	2,673,900
Rivers and streams	10,304,000	10%	1,030,400
Subtotal	28,232,000	—	3,704,300
Saltwater Fishing			
Bays			
San Francisco Bay	750,200[3]	69%	571,638
Other California bays	2,745,800[3]	38%	1,043,404
Estuaries	2,097,600[3]	35%	734,160
Saline lakes	699,200[3]	52%	363,584
Subtotal	6,292,800	—	2,658,786
Total	**34,524,800**	—	**6,363,086**

[1] "Impaired" waters are defined as those assessed and rated by the State of California as medium or poor quality for at least one toxic pollutant or group of pollutants. The ratings of these waters corresponds to U.S. EPA's not fully and partially supporting categories.
[2] Based on a total of 6,992,000 total saltwater fishing days. Assumes 50% in bays (e.g., pier fishing), 30% on estuaries, and 10% on saline lakes. Remainder is open sea fishing not addressed by the rule. Estimated fishing days for San Francisco Bay based on estimated number of anglers from health risk analysis (121,000) multiplied by the average days per angler (6.2) from Huppert (1989).
[3] Calculation of toxic-affected fishing days may not be duplicated exactly due to rounding.
Source: Based on U.S. FWS (1993) and U.S. EPA (1997)

Baseline Fishery Value

[7] The California WQA database categories of medium and poor translate to the U.S. EPA categories of not fully supporting and partially supporting. The medium and less severely impaired waters were grouped together into the partially supporting category. The remaining waters classified as poor were placed in the not fully supporting category.

[8] For example, for river and stream miles, the calculation is (19% × 9%) + (19% × 91% × 50%) = 10%.

To estimate the baseline value of the estimated 6.4-million fishing days (in toxic-impaired waters), EPA reviewed the literature for recreational fishing studies that may be appropriate for valuing fishing in California. These studies, listed in **Exhibit 8-16**, suggest consumer surplus associated with freshwater fishing in the range of $25 to $35 per day. This range is consistent with that found by Walsh et al. (1988) in a national review of studies for freshwater fishing. For saltwater fishing, the study results vary more widely, and depend on the mode of fishing (e.g., charter boat, private boat, or shore fishing) and species sought. However, most of the results fall in the range of $50 to $100. This range is also consistent with the average value reported by Walsh et al. for saltwater fishing ($95 per day).

Exhibit 8-16. Studies Revealing Estimates of Consumer Surplus per Fishing Day

Study	Location/Species	Consumer Surplus Estimate ($1996)
Freshwater		
Roach, 1996	American, Feather, Sacramento, and Yuba rivers	$15.24–$36.89; preferred model specification yields $31.17–$36.37 estimate
Hay, 1988	California bass anglers	$31.17
Loomis and Cooper, 1990	Trout in Feather River	$26.69
Walsh, 1988	Average of national studies	$30.85–$40.08
Saltwater		
NOAA, 1986	Marine fishing in Southern California	Charter: $29.74–$66.24 Private: $82.46–$100.02 Shore/pier: $44.23–$84.01
Huppert, 1989	San Francisco Bay, salmon and striped bass	$70.88–$357.36
Walsh, 1988	Average of national studies	$94.89

The ranges of consumer surplus chosen by EPA, $25 to $35 for freshwater and $50 to $100 for saltwater, were adjusted from 1996 to 1998 first quarter dollars using the CPI as reported in the U.S. Department of Labor (U.S. Bureau of Labor Statistics, 1998)[9]. In 1998 dollars, the ranges are $26 to $37 for freshwater and $53 to $105 for saltwater.[10]

Multiplying toxic-impaired fishing days by the relevant range of consumer surplus per day results in estimates of the baseline value of the fishery (See **Exhibit 8-17**). EPA estimated that the baseline value of these waters in California is currently between $237.2 million and $416.2 million per year.

[9] Note that there is currently a debate regarding the accuracy of the CPI.

[10] Based on the following calculations: ($25 × 1.05 = $26); ($35 × 1.05 = $37); ($50 × 1.05 = 53); ($100 × 1.05 = $105).

Exhibit 8-17. Baseline Value of Fishing Days Occurring in Toxic-Impaired Waters in California (1998 First Quarter Dollars)

	Toxic-Affected Fishing Days	Consumer Surplus per Day	Baseline Value ($ millions)
Freshwater Fishing			
Lakes, reservoirs and ponds	2,673,900	$26-$37	$69.5-$98.9
Rivers and streams	1,030,400	$26-$37	$26.8-$38.1
Subtotal	3,704,300		$96.3-$137.1
Saltwater Fishing			
Bays			
San Francisco Bay	517,638	$53-$105	$27.4-$54.4
Other California bays	1,043,404	$53-$105	$55.3-$109.6
Estuaries	734,160	$53-$105	$38.9-$77.1
Saline lakes	363,584	$53-$105	$19.3-$38.2
Subtotal	2,658,786		$140.9-$279.2
Total	**6,363,086**		**$237.2-$416.2**

Potential Benefits Attributable to the CTR

Multiplying the baseline fishery value ($237.2 million to $416.2 million per year) by the increase in value estimated by Lyke (11% to 31%) results in potential benefits of achieving a "toxic-free" fishery of $26.1 million to $129.0 million per year. The next step is to determine the portion of these benefits that might reasonably be attributable to the CTR. EPA believes that the toxicity-weighted results may be the most meaningful for the estimation of benefits although the unweighted results are also important because the pollutants with relatively lower toxic weights can cause problems in a specific waterbody. The toxic-weighted results indicate a 49.6% reduction in pollutant loadings under the low scenario and a 14.7% reduction under the high scenario. As discussed previously, the two scenarios reflect the uncertainties associated with estimation of point source loadings of toxic pollutants. EPA believes that the midpoint between the two scenarios is a reasonable estimate of potential benefits. The midpoint of this range (32.2%) is close to the unweighted reduction in pollutant loadings under the high scenario (28%). Therefore, EPA estimated potential recreational fishing benefits based on a 32.2% reduction in pollutant loadings and assuming that this reduction is indicative of the reduction of impairment from toxics that will be experienced under the CTR.

Thus, EPA multiplied the total potential benefits by 32.2% and then by the percent of total toxic loadings attributable to point sources in California waters, as presented in Exhibit 7-4. As

presented in **Exhibit 8-18**, the approach results in potential benefits attributable to the CTR of between $1.53 million per year and $12.99 million per year.

Exhibit 8-18. Potential Recreational Angling Benefits from a "Toxic-Free" Fishery Attributable to Implementation of the CTR (Millions of 1998 First Quater Dollars/Year)

	Baseline Fishery Value	Value of "Toxic-Free" Fishery	Reduction in Toxic-Weighted Loadings Due to the CTR	Assumed Point Source Contribution to Total Loadings	Potential Benefits Attributable to the CTR
Freshwater					
Lakes, reservoirs and ponds	$69.5-$98.9	$7.6-$30.7	32.2%	3%	$0.07 - $0.30
Rivers and streams	$26.8-$38.1	$2.9-$11.8	32.2%	3%	$0.03 - $0.11
Saltwater					
San Francisco Bay	$27.4-$54.4	$3.0-$16.8	32.2%	1%–10%	$0.01 - $0.54
Other bays	$55.3-$109.6	$6.1-$34.0	32.2%	42%–64%	$0.82 - $7.00
Estuaries	$38.9-$77.1	$4.3-$23.9	32.2%	42%–64%	$0.58 - $4.92
Saline lakes	$19.3-$38.2	$2.1-$11.8	32.2%	3%	$0.02 - $0.11
Total	**$237.2-$416.2**	**$26.1-$129.0**	—	—	**$1.53 - $12.99**

8.2.2 Value of Increased Participation

In addition to increasing the value of existing angling days, reduced toxic loadings also may increase participation levels. Toxic contamination may discourage recreational fishing participation because of concern that consumption is unsafe. Similarly, knowledge of toxic contamination alone, regardless of consumption concerns, may reduce anglers' participation at a given site. Improving water quality to achieve toxic water quality criteria may restore this lost participation.

Estimating lost participation, however, is difficult for two reasons. First, little is known about how decreases in participation vary given different levels of contamination. When toxic contamination is not publicized or a fish consumption advisory is not posted, toxic-impaired waters may experience no decrease in fishing since anglers may not change their fishing patterns without knowledge of the contamination. Second, the availability of unaffected substitute sites may simply result in a shift in participation from one site to another. It is difficult, however, to account for substitute sites when estimating benefits for such a large area since the availability of substitute sites may vary greatly depending on geographical location and the economic status of the affected anglers. Participation in unaffected waters may actually decrease if participation shifts to the waters improved by implementation of the CTR. Decreased congestion at unimpaired sites will increase an angler's fishing value, however. EPA was not able to account for the effects of reduced congestion or substitute sites when estimating benefits of increased fishing participation.

Since toxic contamination in California occurs statewide, negative perceptions of California's water quality may also exist statewide. A statewide decrease in the level of toxic contamination on all water bodies may improve perceptions of water quality and thus have a positive impact on participation. In addition, as described in Chapter 6, reduced toxic contamination may increase the stability, resilience, and overall health of numerous ecosystems, resulting in higher catch rates. As a result, even if good substitute sites exist for toxic-affected sites, a minimal increase in participation may result from implementation of the CTR.

A limited number of studies have estimated reductions in participation due to water quality degradation. For example, a survey of New York State anglers (Connelly et al., 1988) found that anglers aware of fish consumption advisories took 17% fewer fishing trips. In a study of lake recreation in Wisconsin, Caulkins et al. (1986) estimated that the number of recreationalists using the site would increase by 12% to 16% as a result of general water quality improvements. Other evidence regarding the behavioral response of anglers to fish consumption advisories suggests that between 10% and 37% of anglers take fewer trips in response to fish consumption advisories (Fiore et al., 1989; Silverman, 1990; Knuth and Connelly, 1992; Knuth et al., 1993; West et al., 1993). All of these studies estimate the percentage of *people* that would take fewer trips, not the percentage decrease in angling days. However, these anglers are not expected to eliminate trip-taking, and, as a result, a 5% to 10% reduction in trips may be reasonably assumed. Because public knowledge of toxic contamination varies across water bodies, EPA conservatively assumed a 5% increase in angler participation in estimating the benefits from increased angling participation for all waters except San Francisco Bay. Since a fish consumption advisory was issued for the Bay in 1994, EPA assumed a 10% increase in angler participation for the Bay.

Potential Benefits Attributable to the CTR

EPA estimated the value of increased angling participation in a similar fashion as it estimated the value of improved fishing experiences. EPA multiplied the number of toxic-affected fishing days by 5% (10% for San Francisco Bay) to estimate the expected increase in participation and valued these days using the estimated consumer surplus values presented in Section 8.2.1. To estimate the portion of these benefits attributable to implementation of the CTR, EPA multiplied by the midpoint of expected reduction in loadings (32.2%) and the attribution assumptions developed in Chapter 7. As shown in **Exhibit 8-19**, potential benefits due to increased participation resulting from the CTR range from $0.7 million per year to $2.2 million per year (first quarter 1998 dollars).

Exhibit 8-19. Potential Benefits from Increased Angling Participation (Millions of 1998 First Quarter Dollars/Year)

	Baseline Toxic-Impaired Fishing Days	Additional Fishing Days (5% of Baseline)[1]	Consumer Surplus (per day)	Value of Additional Days	Reduction in Toxic-Weighted Loadings due to the CTR	Assumed Point Source Contribution to Total Loadings	Potential Benefits Attributable to Implementation of the CTR[2]
Freshwater							
Lakes, reservoirs and ponds	2,673,900	133,695	$26–$37	$3.5-$4.9	32.2%	3%	$0.03 - $0.05
Rivers and streams	1,030,400	51,520	$26–$37	$1.3-$1.9	32.2%	3%	$0.01 - $0.02
Subtotal	3,704,300	185,215	$26–$37	$4.8-$6.9	—	—	$0.04 - $0.07
Saltwater							
San Francisco Bay	517,638	51,764	$53–$105	$2.7-$5.4	32.2%	1%–10%	$0.01 - $0.18
Other bays	1,043,404	52,170	$53–$105	$2.8-$5.5	32.2%	42%–64%	$0.37 - $1.13
Estuaries	734,160	36,708	$53–$105	$1.9-$3.9	32.2%	42%–64%	$0.26 - $0.79
Saline lakes	363,584	18,179	$53–$105	$1.0-$1.9	32.2%	3%	$0.01 - $0.02
Subtotal	2,658,786	132,939	$53–$105	$8.4-$16.7	—	—	$0.66 - $2.12
Total	**6,363,086**	**318,154**	—	**$13.2-$23.5**	—	—	**$0.70 - $2.18**

[1] Additional fishing days in San Francisco Bay are estimated to be 10% of the baseline.
[2] Totals may not add up due to rounding.

8.3 NONCONSUMPTIVE WILDLIFE RECREATION VALUES

The 1996 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation (U.S. Department of the Interior, Fish and Wildlife Service, and U.S. Department of Commerce, Bureau of the Census, 1998) indicates that 5.96 million California residents aged 16 or older participated in wildlife watching in 1996. This participation included 17.9 million trips away from home (at least 1 mile) for the primary purpose of observing, photographing, or feeding wildlife. These estimates do not include secondary wildlife-watching activities, such as observing wildlife while pleasure driving (U.S. Department of the Interior, Fish and Wildlife Service, and U.S. Department of Commerce, Bureau of the Census, 1998). Approximately 5.7 million California residents aged 16 or older also participated in wildlife-related activities around the home, including observing, photographing, or feeding wildlife.

Research has shown that nonconsumptive wildlife recreation (viewing wildlife) is highly valued. For example, Rockel and Kealy (1991) estimate a total annual value nationwide of between $8.7 billion and $165 billion in 1980 dollars (with the range of results indicating a sensitivity of their model to functional form). Cooper and Loomis (1991) estimated the total annual value for bird viewing in California's San Joaquin Valley to be $64.7 million (in 1987 dollars), based on willingness to pay (WTP) estimates for all Californians. Cooper and Loomis found that WTP increased as the number of birds seen increased, with diminishing marginal returns evident in their results (Cooper and Loomis, 1991).

As described in the EA that accompanied the proposed CTR, CTR-related improvements in aquatic habitats may lead to healthier and more diverse populations of avian and terrestrial species and may manifest in increased participation and increased user day values for wildlife viewing activities. Without specific information as to the potential magnitude of changes in wildlife populations and thus viewing opportunities that may result from the toxic pollutant loading reductions anticipated under the rule, nonconsumptive wildlife recreation values cannot be estimated. Given the high baseline value, however, these benefits may be appreciable.

8.4 PASSIVE USE (NONUSE) VALUES

As noted in Chapters 5 and 6, individuals may value reduced toxic concentrations in California aquatic environments apart from any values associated with their direct or indirect use of the resource. These passive use (nonuse) values are difficult to estimate in the absence of carefully designed and executed contingent value surveys. "Benefits transfer" techniques, however, can be used to develop a rough approximation of the potential magnitude of these passive use values.

8.4.1 Passive Use Values for Recreational Anglers

Fisher and Raucher (1984) conducted an extensive review of the economics literature providing empirical evidence of the use and nonuse values associated with improved water quality and/or fisheries. Their review indicated that nonuse values are estimated to be *at least* half as great as recreational values. The authors concluded that if passive use values (for example, ecologic

values) are applicable to a policy action, using a 50% approximation is preferred, with proper caveats, to omitting passive use values from a benefit-cost analysis.

Several additional research efforts conducted subsequent to the Fisher and Raucher review provide additional support for the observation that omitting passive use values leads, in most cases, to an appreciable underestimate of total benefits. In some instances, such research has been interpreted to suggest that passive use benefits might be as much as (or more than) twice the recreational use values (e.g., Sutherland and Walsh, 1985; Sanders et al., 1990).

To estimate passive use values from estimates of recreational use benefits as described above, it is important to consider the extent to which the primary research efforts have evaluated resources, and changes in resources, that are reasonably comparable to the policy-affected site and the policy-induced environmental impacts. For the CTR, the resources in question are a large share of the water resources throughout California. These waters in general have, at baseline, some degree of toxics-related impairment, and the anticipated change in conditions due to the CTR will reduce the likelihood or severity of impairment in the future.

Generally, it is appropriate to apply the studies reviewed by Fisher and Raucher to the CTR. For example, the Carson and Mitchell study estimates a nationwide value for incremental freshwater quality improvements. Thus, the use of the 0.5 rule of thumb seems appropriate to an application of the CTR.

Studies with ratios of higher passive use to recreational use values may not be as applicable to the CTR. For example, the Sanders et al. results (implying a ratio of approximately 1.8 or 1.9) are based on a study of the value of preserving several free-flowing river segments in Colorado from the development of dams and other major, irreversible hydrological modifications. Given the magnitude and direction of the environmental change evaluated, coupled with the irreversibility of such changes, one would anticipate a relatively higher ratio of existence and bequest values to direct use values than for a rule similar to the CTR.[11]

Based on the available literature and the environmental changes being considered, EPA estimated passive use values for the CTR as one-half of recreational fishing benefits. These estimates are imprecise for several reasons, including the reliance on the benefits transfer technique and the potential that the underlying primary research studies may not themselves be precise or accurate for the environmental applications to which they were directly applied. It also may be the case that this approach underestimates passive use values because the "ecosystem" benefits may not be fully embodied in the contingent valuation studies being applied, or because of potential

[11] The Sanders et al. (1990) study has similar transferability issues. This study shows passive use values that relate to option price (recreational use and option value) with a ratio of 2 or higher, where the scenario is the potential degradation of a relatively pristine resource (Flathead Lake and River) by coal mining. Given the special qualities of the resource being evaluated (high baseline quality, the largest lake in the western United States), and the direction of change being evaluated (potential pollution from coal mining), the passive use values would be expected to be higher relative to use values than would be anticipated in a CTR context (moderate improvements in water quality in a wide variety of already impaired waters).

underestimation of the applicable recreational use values (if recreational benefits are overstated, then the reverse may be true).

In addition, because some primary studies suggest passive use values may exceed one-half of recreational values, and because recreational fishing values alone are used in lieu of total potential recreational values, the use of the 0.5 ratio is conservative. Furthermore, the primary studies reviewed generally are based on separating the respondent's (household's) total willingness to pay into the two components—passive use value and recreational use value. The 0.5 ratio therefore reflects the amount of passive use value that recreational angling households are willing to pay, above their recreational use values, to preserve or enhance water quality. This rule of thumb suggests that the potential magnitude of passive use values associated with implementation of the CTR for users ranges from $1.1 million per year to $7.6 million per year.

Applying the 50% rule of thumb to the CTR is, in essence, providing a rough estimate of passive use values only for those households that have active recreational anglers. Therefore, this estimate likely provides a very conservative lower bound; it implies that only recreational anglers have passive use values. As described below, EPA developed preliminary estimates of passive use values for non-angling households.

8.4.2 Passive Use Values for Non-Angling Households

To account for the passive use values held by non-angling households, which includes other water recreators such as boaters, swimmers, and nonusers, EPA assumed that the number of angling households is equivalent to the number of licensed anglers in the State of California. EPA then subtracted the number of angling households from all households in California to obtain the number of non-angling households. Because it is likely that there is more than one angler in some households, this assumption is conservative in that it will result in a lower estimate of non-angling households and values.

As an upper-bound estimate of passive use values for non-angling households, EPA assumed that these households have a passive use value equal to that of angling households. As a lower-bound estimate, EPA assumed that all non-angling households are nonuser households, and that they hold lower passive use values than angling households. EPA did not find any literature that provides an indication of how much lower these values might be. Some studies, however, provide information on the relationship between total WTP for water quality improvements for users and nonusers.

WTP Values for Users and Nonusers

EPA found several contingent valuation studies that estimated WTP for users and nonusers of water resources (See **Exhibit 8-20**); however, most of these studies have little relevance to the CTR. Brown and Duffield (1995) estimated WTP to protect the instream flow of a single river and a group of five rivers. Olsen et al. (1991) estimated WTP to double the size of salmon and steelhead runs in the Columbia River Basin. Croke et al. (1986–1987) estimated the WTP to improve water impaired by sewer overflows in Chicago to a level acceptable for outings, boating, and fishing. While these studies show how WTP compares for users and nonusers, they do not evaluate water quality controls or improvements similar to those anticipated for the CTR.

Additionally, Bockstael et al. (1989) report WTP to raise Chesapeake Bay water quality so that it is acceptable for swimming. This study evaluated WTP for clean-up efforts devoted to reducing toxic substances, but it also addresses nutrient over-enrichment and the decline of submerged vegetation. Mean WTP to make the bay acceptable for swimming was $38 for nonusers, which is approximately 31% of the value for users ($121). Since WTP for users includes a use value, 31% likely understates the relationship between passive use values between users and nonusers

Exhibit 8-20. Relationship Between Willingness to Pay Values for Users and Nonusers[1]

Study	WTP for Improvement		Ratio of WTP (nonusers to users)
	Users	Nonusers	
Brown and Duffield (1995)			
One river	$10.18	$3.55	35%
Five rivers	$18.02	$2.02	11%
Loomis et al. (1991)[2]			
Salmon improvement	$202	$181	90%
Contamination reduction	$360	$308	86%
Wetland improvement	$286	$251	88%
Olsen et al. (1991)	$6.18	$2.21	36%
Bockstael et al. (1989)	$121	$38	31%
Croke et al. (1986–1987)	$49.63	$45.76	92%

[1] Year of dollars for the WTP values are not reported since only the ratio between nonuser and user values are compared as opposed to the values themselves.

[2] WTP for users reflects survey responses of local households. WTP for nonusers reflects survey responses of the rest of California's households.

Loomis et al. (1991) may be the most applicable study. Loomis et al. (1991) estimated the benefits to California residents near a resource (users) and nonusers of improved fishery, wetland, and waterfowl resources in the San Joaquin Valley. They used a contingent value survey to determine California households' WTP to implement three wildlife programs: wetlands habitat and wildlife maintenance and improvement, wildlife contamination control, and San Joaquin River and salmon improvement. Mean WTP to improve salmon populations was $202 for users and $181 for nonusers. Mean WTP for contamination reduction was $360 for users and $308 for nonusers. Mean WTP for wetland improvement was $286 for users $251 for nonusers.

Thus, Loomis et al. (1991) provides California-specific research suggesting that nonusers' WTP may be 85% to 90% of the WTP for users.

Lower-Bound Estimate

Due to the nature of the impairment addressed by the CTR, it is likely that improvements may be more valued by users than nonusers, who may even be unaware of the contamination. Thus, as a lower-bound estimate, EPA assumed that passive use values for non-angling households may be 30% of those for angling households. This estimate is supported by Bockstael et al. (1989) who evaluated WTP for clean-up efforts devoted to reducing toxic pollutants to improve water quality in the Chesapeake Bay.

To estimate the number of non-angling households, EPA assumed that the number of recreational angling households is equivalent to the number of licensed recreational anglers, or approximately 1.4 million (California Department of Fish and Game, 1996). Subtracting this from the total number of households in California (approximately 11.1 million; U.S. Bureau of the Census, 1995) yields approximately 9.7 million non-angling households. Assuming a passive value that is 30% of the passive value for angling households yields a range of benefits from $2.3 million to $15.8 million per year for all non-angling households.[12]

Upper-Bound Estimate

As an upper bound, EPA assumed that passive use values for non-angling households may be 90% of those for angling households. This estimate is supported by Loomis et al. (1991), who specifically surveyed California residents near a resource (users) and statewide (nonusers). Multiplying the per household annual value for angling households, the number of non-angling households in California (9.7 million), and the assumed 90% passive use value for nonusers, results in a range of benefits from $7.0 million to $47.3 million per year.[13]

The overall passive use benefits for non-angling households range from $2.3 million per year to $47.3 million per year.

[12] EPA calculated a per household value for angling households of $0.80–$5.42 per year by dividing the passive use value estimated in the previous section ($1.1–$7.6 million per year) by the estimated number of angling households (1.4 million). Thirty percent of this value yields $0.24–$1.63 per household for non-angling households.

[13] The per household value for non-angling households is $0.72 - $4.88 in this case.

8.5 TOTAL VALUE OF SIMILAR IMPROVEMENTS

An alternative to estimating the individual categories of benefits resulting from water quality improvements is to estimate a total value for all types of benefits. Carson et al. (1994) and Loomis et al. (1991) provide total values for toxic-related water quality improvements based on contingent valuation research for California households. Carson et al. (1994) estimated the total value of a program to reduce the recovery time for four species in the Southern California Bight (bald eagles, peregrine falcons, white croaker, and kelp bass) that have been adversely affected by 4,4-DDT and PCBs. The authors estimated a household WTP of $55.61 in a one-time payment for the reduced recovery time. Loomis et al. (1991) estimated annual California household WTP of $254 in the form of higher taxes for wetland habitat improvement, $313 for water contamination reduction, and $183 for salmon fishery improvement (the study notes that the benefit of all three aspects would be somewhat less than the sum of the individually estimated benefits). Given the differences between the programs valued in these studies and the CTR, benefits transfer of a per household value for the CTR would be difficult. However, the studies illustrate WTP for the toxic-related water quality improvements anticipated from the CTR.

8.6 SUMMARY OF MONETIZED BENEFITS

A summary of the estimated monetized benefits from implementation of the CTR is provided in **Exhibit 8-21.** Human health benefits are estimated for San Francisco Bay and statewide freshwater resources; all other benefits are estimated statewide.

Exhibit 8-21. Summary of Annual Benefits from Implementation of the CTR (Millions of 1998 First Quarter Dollars)

Benefit Category	Annual Value
Human Health (cancer risk)	
San Francisco Bay	$0.1 - $0.4
Other saltwater resources	+
Freshwater resources	$1.17 - $4.20
Recreational Angling	
Increased value of existing trips	$1.53 - $12.99
Increased participation	$0.70 - $2.18
Wildlife Viewing	+
Passive Use	
Households with recreational anglers	$1.12 - $7.59
Other households	$2.32 - $47.31
Omitted Benefits[1]	+
Total	**$6.94 - $74.71**

[1] Benefits not monetized include noncancer human health effects, water-related recreation apart from fishing, and consumptive and nonconsumptive land-based recreation.
+: Positive benefits expected but not monetized.

The key omissions, biases, and uncertainties associated with the benefits analysis are shown in **Exhibit 8-22.** It was difficult to assess the overall impact of the omissions, biases, and uncertainties on the benefits estimates because the degree to which they might cause the

estimates to be underestimated or overestimated cannot be predicted with accuracy. Among the key factors described in Exhibit 8-22, however, the omission of potential benefit categories may have the most significant impact and would contribute to an underestimate of benefits. Several categories of potential or likely benefits were omitted from the quantified and monetized estimates (e.g., see U.S. EPA, 1997). In terms of potential magnitudes of benefits, the following are likely to be the most significant contributors to the underestimation of the monetized values presented in Exhibit 8-21:

> Improvements in water-related (in-stream and near-stream) recreation apart from fishing. The omission of boating, swimming, picnicking, and related in-stream and stream-side recreational activities from the benefits estimates could contribute to an appreciable underestimation of total benefits. Such recreational activities have been shown in empirical research to be highly valued, and even modest changes in participation and or user values could lead to sizable benefits statewide. Some of these activities can be closely associated with water quality attributes, particularly swimming. Other recreational activities may be less directly related to the CTR-induced water quality improvements, but might nonetheless increase due to their association with fishing, swimming, or other activities in which the participants might engage.
>
> Improvements in consumptive and nonconsumptive land-based recreation, such as hunting and wildlife viewing. CTR-related improvements in aquatic habitats may lead (via food chain and related ecologic benefit mechanisms) to healthier, larger, and more diverse populations of avian and terrestrial species, such as waterfowl, eagles, and otters. Improvements in the populations for these species could manifest as improved hunting and wildlife viewing opportunities, which might in turn increase participation and user day values for such activities. Although the scope of the benefits analysis has not allowed a quantitative assessment of these values at either baseline or post CTR conditions, these benefits may be appreciable.

Exhibit 8-22. Key Omissions, Biases, and Uncertainties in the Benefits Analysis for the CTR

Omissions/Biases/Uncertainties	Direction of Impact on Benefit/Cost Estimates	Comments
The monetized estimate of benefits omits some categories (e.g., noncancer human health effects, water-related recreation apart from fishing, and consumptive and nonconsumptive land-based recreation).	(-) The omission of potential benefit categories will cause benefits to be underestimated.	The potential magnitude of these benefits may be appreciable.
Human health benefits for saltwater anglers were estimated for San Francisco Bay only.	(-) The omission of other saltwaters may cause benefits to be underestimated.	The number of anglers fishing in other bays, estuaries, and saltwater lakes is estimated to be over 0.5 million anglers (U.S. EPA, 1997).
Human health exposure was calculated based on the assumption that each fish contained all contaminants of concern at the concentrations reported in the fish tissue data.	(+) To the extent that not all fish contain all contaminants at the assumed concentrations, benefits may be overestimated.	The uncertainties in estimating fish tissue concentrations are inherent in the approach used to estimate human health benefits.
Human health risks were based on contaminant concentrations in fish fillets or, for some species, fish fillets with skin.	(-) The use of fish fillets will underestimate risks to anglers that consume other body parts or untrimmed fillets.	The Santa Monica Bay Seafood Consumption Study (MBC Applied Environmental Services, 1994) reported that one-third of all anglers eat fish whole (but gutted), including nearly 50% of Asians and 44% of Hispanics.
Human health risks were based on contaminant concentrations in raw fish fillets.	(+) The use of raw fish fillets may overestimate benefits.	OEHHA (1991) noted that DDT concentrations decreased by 20% to 80% after cooking.
Toxic-impaired waters were defined as waters rated as medium or poor quality for at least one toxic pollutant or group of pollutants. The rating of these waters corresponds to U.S. EPA's not fully and partially supporting categories.	(+) The inclusion of medium-rated waters may result in an overestimate of toxic-impaired waters.	Toxic-impaired waters provide the basis for estimating toxic-impaired fishing days and thus recreational angling and passive use benefits.
Estimation of the increased value of current angling and increased participation in recreational angling assumes that anglers have not substituted away from contaminated waters.	(+) The assumption that anglers have not substituted away from contaminated waters is likely to cause benefits to be overestimated.	It is likely that some anglers have substituted away from contaminated waters.
Overall Impact on Benefits Estimates	(?)	The overall impact on benefits is uncertain because the degree to which the omissions, biases, and uncertainties might cause the estimates to be underestimated or overestimated is unknown.

+: Potential overestimate.
□: Potential underestimate.
?: Uncertain impact.

9.0 COMPARISON OF POTENTIAL BENEFITS TO COSTS

This chapter compares the potential benefits and costs attributable to implementation of the CTR. EPA compared these estimates using two approaches: (1) a direct comparison of annualized costs to benefits, and (2) a comparison of discounted benefits and costs.

9.1 COMPARISON OF ANNUALIZED BENEFITS AND COSTS

A direct comparison of the monetized annual (steady-state) benefits of the CTR and annualized costs shows benefits and costs to be generally commensurate given the uncertainty in the analysis and that several categories of benefits are unmonetized. As shown in **Exhibit 9-1**, the estimate of monetized benefits ranges from $6.9 million per year to $74.7 million per year. Annualized costs are $33.5 million under the low scenario and $61.0 million under the high scenario.

Exhibit 9-1. Comparison of Annual Potential Benefits and Costs of Implementing the CTR (Millions of 1998 First Quarter Dollars)

Comparison Method	Monetized Benefits	Annualized Costs	
		Low Scenario	High Scenario
Direct Annual Comparison[1]	$6.9 - $74.7	$33.5	$61.0

[1] These monetized costs and benefits are not directly comparable since several categories of benefits have not been monetized.

9.2 COMPARISON OF DISCOUNTED BENEFITS AND COSTS

Because the benefits and costs associated with implementation of the CTR may be characterized by an initial outlay of capital costs and a gradual phase-in of benefits, **Exhibit 9-2** presents a present value of benefits and costs over 30 years. This method applies a present value social accounting in which the streams of future benefits and costs are discounted to their present values to reflect society's rate of time preference. EPA considered two different phase-in scenarios to account for the potential delay in realizing benefits since many of the pollutants addressed by the CTR are persistent in the environment. To the extent that benefits of reducing toxic pollutants under the CTR are realized sooner, these scenarios may result in an underestimate of the present value of benefits. EPA assumed that there is a 7% opportunity cost of capital and that capital is replaced every 10 years. Since the life of capital typically exceeds 10 years, this assumption may result in an overestimate of costs. EPA calculated the present value of the streams of benefits and costs using discount rates of 3% and 7%.

As shown in Exhibit 9-2, discounted costs fall within the range of discounted benefits under the low scenario, but discounted costs exceed discounted benefits in three of the four cases shown for the high scenario. However, the assumption that capital is replaced every 10 years likely overstates costs. At the same time, benefits may be understated because some categories are not monetized and full benefits may be realized sooner than 10 or 20 years. Thus, EPA expects that the present value of benefits and costs is more commensurate than shown.

Exhibit 9-2. Comparison of Discounted Benefits and Costs of Implementing the CTR (Millions of 1998 First Quarter Dollars)[1]

Schedule of Benefits	Benefits[2]	Costs[3]	
		Low	High
3% Discount Rate			
10-Year Phase-In of Benefits	$108 - $1166	$617	$1033
20-Year Phase-In of Benefits	$82 - $883	$617	$1033
7% Discount Rate			
10-Year Phase-In of Benefits	$63 - $683	$421	$767
20-Year Phase-In of Benefits	$45 - $480	$421	$767

[1] Present values over 30 years.
[2] Benefits are phased in proportionately over 10 and 20 years, and have their full value in the remaining years. Benefits are not directly comparable to costs since several categories of benefits have not been monetized.
[3] Reflects capital costs plus a 7% cost of capital in years 1, 11, and 21, operating and maintenance costs in years 2 through 30.

9.3 CONCLUSIONS

Comparison of annual values of benefits and costs resulting from implementation of the CTR shows estimated costs falling within the range of monetized benefits. Comparison of 30-year present values of benefits and costs also shows costs under the low scenario to fall within the range of monetized benefits although costs under the high scenario generally fall just outside this range. However, EPA believes that benefits may actually be higher than shown because some categories of potential benefits have not been quantified or monetized. EPA was not able to quantify or monetize potential improvements in water-related recreation apart from fishing, such as boating, swimming, picnicking, and related in-stream and stream-side recreational activities. EPA was also unable to quantify or monetize potential improvements in wildlife viewing. Research indicates that wildlife viewing is a highly valued activity and that California residents value reductions in toxic pollutants that may affect wildlife resources. Thus, these omissions may result in an underestimate of benefits. In addition, using a capital life of 10 years likely overestimates potential compliance costs.

10.0 REFERENCES

American Lung Association. 1995. Dollars and Cents: The Economic and Health Benefits of Potential Particulate Matter Reductions in the United States. Prepared by L.G. Chestnut, Hagler Bailly Consulting, Inc. Boulder, CO.

Barron, M.G., and K.B. Woodburn. 1995. Ecotoxicology of Chlorpyrifos. *Rev. Environ. Contamin. Toxicol. Chem* 144:1–93.

Bockstael, N.E., K.E. McConnel, and I.E., Strand. 1989. Measuring the Benefits of Improvements in Water Quality: The Chesapeake Bay. *Marine Resource Economics* 6:1–18.

Brock, T.C.M., M. van den Bogaert, A.R. Bos, S.W.F. van Breukelen, R. Reiche, R.M.M. Roijackers, R.E.M. Suykerbuyk, and Terwoert. 1992. Fate and Effects of the Insecticide Dursban 4E in Indoor *Elodea*-dominated and Macrophyte-free Freshwater Model Ecosystems: II. Secondary Effects on Community Structure. *Arch Environ Contamin Toxicol* 23:391–409.

Brown,T.C., and J.W. Duffield. 1995. Testing Part-Whole Valuation Effects in Contingent Valuation of Instream Flow Protection. *Water Resources Research* 31 (9):2341–51.

CDFG (California Department of Fish and Game, Inland Fisheries Division). 1995. Sacramento River System Sport Fish Catch Inventory, Final Performance Report.

California Regional Water Quality Control Board. 1997. Santa Monica Bay: State of the Watershed.

California State Water Resources Control Board. 1995. California's Rivers and Streams: Working Toward Solutions (for California's Rivers and Streams).

California State Water Resources Control Board. 1996. California 305(b) Report on Water Quality.

Carson, R.T., et al. 1994. Prospective Interim Lost Use Value Due to DDT and PCB Contamination in the Southern California Bight. Report prepared by NRDA, Inc., and Industrial Economics, Inc. to NOAA. La Jolla, CA.

Caulkins, P.P., R. Bishop, and N. Bouwes. 1986. The Travel Cost Model for Lake Recreation: A Comparison of Two Methods for Incorporating Site Quality and Substitution Effects. *American Journal of Agricultural Economics.*

City of San Jose. 1994. Industrial Mass Audit Studies Summary Report.

Connelly, N.A., T. Brown, and B. Knuth. 1988. New York Statewide Angler Survey. Prepared for the New York State Department of Environmental Conservation, Bureau of Fisheries.

Cooper, J and J. Loomis. 1991. Economic Value of Wildlife Resources in the San Joaquin Valley: Hunting and Viewing Values. *Economics and Management of Water and Drainage in Agriculture.*

Croke, K., R. Fabian, and G. Brenniman. 1986–1987. Estimating the Value of Improved Water Quality in and Urban River Systems. *Journal of Environmental Systems* 16(1):13–23.

Davis, J.A., A.J. Gunther, B.J. Richardson, and J.M. O'Connor. 1991. Status and Trends Report on Pollutants in the San Francisco Estuary. Prepared by the San Francisco Bay – Delta Aquatic Habitat Institute for the San Francisco Estuary Project. U.S. EPA, San Francisco, CA.

Eaton, J., J. Arthur, R. Hermanutz, R. Kiefer, L. Mueller, R. Anderson, R. Erickson, B. Nordling, J. Rogers, and H. Pritchard. 1985. Biological effects of continuous and intermittent dosing of outdoor experimental streams with chlorpyrifos. *Aquatic Toxicology and Hazard Assessment: 8th Symposium*. Bahner, R.C., Hansen, D.J., eds. ASTM STP 891. Philadelphia, PA.

Eisenberg, Oliveri & Associates, Inc. (EOA). 1994. City of Sunnyvale Summary of Pollution Prevention Studies. Submitted in fulfillment of CDO 93-086, Provisions IIA and IIB.

Eisler, R. 1985a. Cadmium Hazards to Fish, Wildlife, and Invertebrates: A Synoptic Review. Prepared by U.S. Fish and Wildlife Service, Patuxent Wildlife Research Center, Laurel, MD. Sponsored by U.S. Department of the Interior. *Biological Report* 85(1.2).

Eisler, R. 1985b. Selenium Hazards to Fish, Wildlife, and Invertebrates: A Synoptic Review. Contaminant Hazard Review Report #5. USFWS Patuxent Wildlife Research Center, Laurel, MD.

Eisler, R. 1986a. Chromium Hazards to Fish, Wildlife, and Invertebrates: A Synoptic Review. U.S. DOI. Contaminant Hazard Reviews Report No. 6. *Biological Report* 85(1.6).

Eisler, R. 1986b. Dioxin Hazards to Fish, Wildlife, and Invertebrates: A Synoptic Review. Prepared by U.S. Fish and Wildlife Service, Patuxent Wildlife Research Center, Laurel, MD. Sponsored by U.S. Department of the Interior. *Biological Report* 85(1.8).

Eisler, R. 1986c. Polychlorinated Biphenyl Hazards to Fish, Wildlife, and Invertebrates: A Synoptic Review. *U.S. Fish Wildl. Serv. Biol. Rep.* 85(1.7).

Eisler, R. 1987a. Mercury Hazards to Fish, Wildlife, and Invertebrates: A Synoptic Review. Prepared by U.S. Fish and Wildlife Service, Patuxent Wildlife Research Center, Laurel, MD. Sponsored by U.S. Department of the Interior. *Biological Report* 85(1.10).

Eisler, R. 1987b. Polycyclic Aromatic Hydrocarbon Hazards to Fish, Wildlife, and Invertebrates: A Synoptic Review. Prepared by U.S. Fish and Wildlife Service, Patuxent Wildlife Research Center, Laurel, MD. Sponsored by U.S. Department of the Interior. *Biological Report* 85(1.11).

Eisler, R. 1988a. Arsenic Hazards to Fish, Wildlife, and Invertebrates: A Synoptic Review. Prepared by U.S. Fish and Wildlife Service, Patuxent Wildlife Research Center, Laurel, MD. Sponsored by U.S. Department of the Interior. *Biological Report* 85(1.12).

Eisler, R. 1988b. Lead Hazards to Fish, Wildlife, and Invertebrates: A Synoptic Review. Prepared by U.S. Fish and Wildlife Service, Patuxent Wildlife Research Center, Laurel, MD. Sponsored by U.S. Department of the Interior. *Biological Report* 85(1.14).

Eisler, R. 1993. Zinc Hazards to Fish, Wildlife, and Invertebrates: A Synoptic Review. Prepared by the U.S. Department of Interior. Contaminant Hazard Reviews Report 26. *Biological Report* 10.

FIMS and FAA (Fishery Information Management Systems, Inc. and Department of Fisheries and Allied Aquaculture). 1993. Estimation of Daily Per Capita Freshwater Fish Consumption of Alabama Anglers. Prepared for Alabama Department of Environmental Management. Montgomery, AL.

Fiore, B.J., H.A. Anderson, L.P. Hanrahan, L.J. Olson, and W.C. Sonzogni. 1989. Sport Fish Consumption and Body Burden Levels of Chlorinated Hydrocarbons: A Study of Wisconsin Anglers. *Archives of Environmental Health* 44(2):82–88.

Fisher, A., and R. Raucher. 1984. Intrinsic Benefits of Improved Water Quality. *Advances in Applied Micro-Economics* 3:37–66.

Goyer, R.A. 1991. Toxic Effects of Metals. In *Casarett and Doull's Toxicology, The Basic Science of Poisons 4th ed.* Ambur, M.O., J.Doull, and C.D. Klaassen, eds. New York: Pergamon Press.

Gunther, A.J., J.A. Davis, and D.J.H. Phillips. 1987. An Assessment of the Loading of Toxic Contaminants to the San Francisco Bay-Delta. Prepared by Aquatic Habitat Institute.

Hay, M.J. 1988. Net Economic Values of Nonconsumptive Wildlife-Related Recreation. Division of Policy and Directives Management, U.S. Fish and Wildlife Service, Washington, D.C.

Hoffman, D.J., B.A. Rathner, G.A. Benton, Jr., and J. Cairns, Jr. 1995. *Handbook of Ecotoxicology*. Boca Raton, FL: Lewis Publishers.

Huppert, D.D. 1989. Measuring the Value of Fish to Anglers: Application to Central California Anadramous Species. *Marine Resource Economics* 6:89–107.

Kersting, K. 1994. Functional Endpoints in Fielding Testing. *Freshwater Field Tests for Hazard Assessment of Chemicals*. I.A. Hill, F. Heimbach, P. Leewangh, and Matthiesen eds. Ann Arbor, MI: Lewis Publishers.

Knuth, B.A., and N.A. Connelly. 1992. Is New York's Health Advisory on Fish Consumption Making a Difference? *Coastlines* 22(4):4–5.

Knuth, B.A., N.A. Connelly, and M.A. Shapiro. 1993. Angler Attitudes and Behavior Associated with Ohio River Health Advisories. Prepared by the Human Dimensions Behavior Research Unit of the Department of Natural Resources of the New York State College of Agriculture and Life Sciences. HDRU Series No. 93-6.

Loomis, J., and J. Cooper. 1990. Economic Benefits of Instream Flow to Fisheries: A Case Study of California's Feather River. *Rivers* ___ 23–30.

Loomis, J, M. Haneman, B. Kanninen, and T. Wegge. 1991. Willingness to Pay to Protect Wetlands and Reduce Wildlife Contamination for Agricultural Drainage. *Economics and Management of Water and Drainage in Agriculture.*

Lyke, A.J. 1993. Discrete Choice Models to Value Changes in Environmental Quality: A Great Lakes Case Study. Dissertation, 376. University of Wisconsin-Madison.

MBC Applied Environmental Services. 1994. Santa Monica Bay Fish Consumption Study – September 1991 to August 1992. Prepared for Santa Monica Bay Restoration Project.

National Marine Fisheries Service. 1987–1989 and 1993. National Marine Recreational Fishery Statistics Survey, Pacific Coast. As cited in Chapter 3 of U.S. EPA (1997).

NOAA (National Oceanic and Atmospheric Administration). 1988a. The National Coastal Pollutant Discharge Inventory: Estimates for San Francisco Bay. Data Summary, Ocean Assessments Division, Office of Oceanography and Marine Assessment National Ocean Service.

NOAA. 1988b. The National Coastal Pollutant Discharge Inventory: Estimates for Santa Monica Bay, San Pedro Bay, and San Diego Bay. Data Summary, Ocean Assessments Division, Office of Oceanography and Marine Assessment National Ocean Service.

NOAA. 1988c. The National Coastal Pollutant Discharge Inventory: Estimates for Humboldt Bay and Monterey Bay. Data Summary, Ocean Assessments Division, Office of Oceanography and Marine Assessment National Ocean Service.

NOAA. 1986. As cited in Chapter 7 of U.S. EPA (1997).

OEHHA (Office of Environmental Health Hazard Assessment). 1991. A Study of Chemical Contamination of Marine Fish from Southern California, Volume II: Comprehensive Study.

Olsen, D., J. Richards, and R.D. Scott. 1991. Existence and Sport Values for Doubling the Size of Columbia River Basin Salmon and Steelhead Runs. *Rivers* 2(1):44–56.

Rand, G.M., and S.R. Petrocelli. 1985. *Fundamentals of Aquatic Toxicology: Methods and Applications*. Washington, D.C: Hemisphere Publishing Corporation.

Roach, B. 1996. Angler Benefits Along Four California Rivers: An Application of Tobit Analysis.

Rockel, M.L. and M.J. Kealy. 1991. The Value of Nonconsumptive Wildlife Recreation in the United States. *Land Economics* 67(4):422-34.

SAIC (Science Applications International Corporation). 1993. Assessment of Compliance Costs Resulting From Implementation of the Proposed Great Lakes Water Quality Guidance. Final Report. Prepared for U.S. Environmental Protection Agency.

SAIC. 1997. Analysis of Potential Costs Related to the Implementation of the California Toxics Rule. Final Draft. Prepared for the U.S. Environmental Protection Agency.

Sanders, L.D., R.G. Walsh, and J.B. Loomis. 1990. Toward Empirical Estimation of the Total Value of Protecting Rivers. *Water Resources Research* 26(7):1345–57.

SFRWQCB (San Francisco Regional Water Quality Control Board). 1994. Contaminant Levels in Fish Tissue from San Francisco Bay, Final Draft Report. San Francisco, CA.

Shacklette, H.T. and J.G. Beorngen. 1984. Element Concentrations in Soils and Other Surficial Materials of the Conterminous United States. U.S. Geological Survey Professional Paper 1270.

Silverman, W.M. 1990. Michigan's Sport Fish Consumption Advisory: A Study in Risk Communication. A thesis submitted to the University of Michigan.

Smith, A.G. 1991. Chlorinated Hydrocarbon Insecticides. In *Handbook of Pesticide Toxicology, Volume 2 Classes of Pesticides*. W.J. Hayers, Jr. and E.R. Laws, Jr. eds. Academic Press, Inc.

Sutherland, R.J. and R.G. Walsh. 1985. Effect of Distance on the Preservation Value of Water Quality. *Land Economics* 61(3):282–91.

U.S. Bureau of Census. 1980. As cited in Chapter 3 of U.S. EPA (1997).

U.S. Bureau of Census. 1995. *1995 Statistical Abstract.* U.S. Department of Commerce, Economics and Statistics Administration.

U.S. Bureau of the Census. 1996. Estimates of Housing Units, Households, Households by Age of Householder, and Persons per Household. ST-96-20R.

U.S. Bureau of Labor Statistics. 1998. U.S. Department of Labor, All Urban Consumers, U.S. City Average. [ftp//ftp.bls.gov].

U.S. EPA (U.S. Environmental Protection Agency). 1980a. Ambient Water Quality Criteria for Silver. EPA 440/5-80-071. United States Environmental Protection Agency. Office of Water, Washington, D.C.

U.S. EPA. 1980b. Ambient Water Quality Criteria for Nickel. EPA 440/5-80-060. Office of Water Regulations and Standards Criteria, Criteria and Standards Division, Washington, D.C.

U.S. EPA. 1982. As cited in Chapter 3 of U.S. EPA (1997).

U.S. EPA. 1985. Ambient Water Quality Criteria for Copper – 1984. EPA 440/5-84-031. Office of Water Regulations and Standards Criteria, Criteria and Standards Division, Washington, D.C.

U.S. EPA. 1989a. Assessing Human Health Risks from Chemically Contaminated Fish and Shellfish: A Guidance Manual. EPA 503/8-89-002. Office of Marine and Estuarine Protection, Washington, D.C.

U.S. EPA. 1989b. Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual. Office of Emergency and Remedial Response, Washington, D.C.

U.S. EPA. 1991. Technical Support Document for Water Quality-based Toxics Control. EPA 505/2-90-001. Office of Water, Washington, D.C.

U.S. EPA. 1992. National Study of Chemical Residues in Fish, Volumes I and II. EPA 832-R-92-008a,b. Office of Science and Technology, Washington, D.C.

U.S. EPA. 1993. Guidance for Assessing Chemical Contaminant Data for Use in Fish Advisories: Volume 1, Fish Sampling and Analysis. EPA 823-R-93-002. Office of Water, Washington, D.C.

U.S. EPA. 1994. Water Quality Standards Handbook: Second Edition (Update #1). Office of Water, Washington, D.C.

U.S. EPA. 1996. The Metals Translator: Guidance for Calculation of a Total Recoverable Permit Limit From a Dissolved Criteria. EPA 823-B-96-007. Office of Water, Washington, D.C.

U.S. EPA. 1997. Analysis of the Potential Benefits Related to Implementation of the California Toxics Rule. Office of Sustainable Ecosystems and Communities, Office of Policy, Planning and Evaluation and EPA Region 9.

U.S. Department of the Interior, Fish and Wildlife Service and U.S. Department of Commerce, Bureau of the Census. 1998. 1996 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation.

Vena, J.E. 1992. Risk Perception, Reproductive Health Risk and Consumption of Contaminated Fish in a Cohort of New York State Anglers. Research Program in Occupational and Environmental Health, State University of New York at Buffalo.

Verschueren, K. 1983. *Handbook of Environmental Data on Organic Chemicals 2nd. ed.* New York: Van Nostrand Reinhold.

Walsh, R., D.M. Johnson, and J.R. McKean. 1988. Review of Outdoor Recreation Economic Demand Studies with Nonmarket Benefit Estimates, 1968–1988.

Water Resources Control Board. 1988. Nonpoint Source Management Plan.

Water Resources Control Board. 1991. Toxic Substances Monitoring Program, *Data Report (91-1WQ)*. California Environmental Protection Agency.

Water Resources Control Board. 1994. Water Quality Assessment. California Environmental Protection Agency.

West, P.C., J.M. Fly, R. Marans, and D. Rosenblatt. 1993. Minorities and Toxic Fish Consumption: Implications for Point Discharge Policy in Michigan.

APPENDIX A. ALTERNATIVES ANALYSIS

In conducting an analysis of the potential costs to point source dischargers as a result of implementing the CTR, EPA made a variety of assumptions. To test the impact of some of these assumptions on the analysis, EPA conducted two alternative analyses. First, EPA estimated the impact on costs associated with changing the human health risk level for carcinogenic pollutants. Second, EPA estimated the impact on costs associated with changing the application of criteria for heavy metals. Sections A.1 and A.2 present the methodology and costs associated with varying the human carcinogenic risks and applying toxic metals criteria in total recoverable form, respectively.

A.1 IMPACT OF HUMAN HEALTH RISK LEVEL

According to EPA's *Water Quality Standards Handbook:* Second Edition (U.S. EPA, 1994), EPA generally regulates carcinogenic toxic pollutants based on a range of assumed risk levels. This range is established based on 1 excess cancer case per 10,000 people (10^{-4}), 1 excess cancer case per 100,000 people (10^{-5}), and 1 excess cancer case per 1,000,000 people (10^{-6}). However, EPA does not recommend a particular risk level as policy.

The State of California historically has protected at a 10^{-6} risk level for carcinogenic pollutants. The CTR follows this history and establishes human health criteria for carcinogens based on a 10^{-6} risk level. The potential costs discussed in Chapter 4 of this report are based on these criteria.

In its readoption of its statewide plans for inland surface waters and enclosed bays and estuaries, however, California may consider other risk levels for carcinogenic pollutants. Again, EPA recommends that states consider minimum risk levels in the range of 10^{-4} to 10^{-6} for carcinogenic priority toxic pollutants to protect public health and welfare. Many states base their human health protection criteria on a 10^{-5} risk level.

The purpose of this analysis is to determine the change in potential costs should the CTR criteria for human health protection from carcinogens be based on a 10^{-5} risk level.

A.1.1 Methodology

EPA used the same methods described in Chapter 4 of this report to derive potential costs related to the use of a lower risk level for carcinogens. The only modification to the methodology is that EPA adjusted the proposed CTR criteria for carcinogens to reflect a lower risk level of 10^{-5}.

A.1.2 Results

Exhibit A-1 summarizes the results of the analysis of lowering the risk level for carcinogens in the proposed CTR. As Exhibit A-1 shows, the changes in estimated costs and pollutant load

reductions based on the lower risk level of 10^{-5} are minimal. Under the low scenario, costs decrease by $1.1 million, approximately 11% less than the costs based on the higher risk level. Under the high scenario, annual costs decrease by $5.8 million, also an 11% decrease from the costs based on a 10^{-6} risk level. Pollutant load reductions attributable to use of a lower risk level are estimated to decrease by approximately 4% and 1% under the low and high scenarios, respectively.

Exhibit A-1. Comparison of Estimated Costs if CTR-Based WQBELS Are Calculated Using a Cancer Risk Level of 10^{-5}

Approach	Low Scenario		High Scenario	
	Estimated Annual Costs ($millions)	Load Reductions (10^6 lbs-eq/yr)	Estimated Annual Costs ($millions)	Load Reductions (10^6 lbs-eq/yr)
Baseline Cost Analysis (10^{-6})	$33.5	1.08	$61.0	2.73
Alternative Analysis (10^{-5})	$32.4	1.04	$55.2	2.69

Note: All costs are in first quarter 1998 dollars.

The low sensitivity to the change in risk level primarily is related to the fact that most of the potential costs related to implementing the CTR are being driven by metals. Changes in risk levels for carcinogens primarily affect organic pollutants.

A.2 IMPACT OF METAL TRANSLATORS

The criteria for metals in the proposed rule are expressed in the dissolved form. Where a site specific or theoretical "translator" is used, the use of dissolved metals criteria usually results in permit limits that are less stringent than those derived from total recoverable criteria. The dissolved criteria in the CTR are derived by multiplying the total recoverable criterion by a conversion factor. Permitting regulations, however, require that permit limits be set in terms of total recoverable metals concentrations. Therefore, permit writers must "translate" dissolved criteria to derive total recoverable permit limits which can be done through a variety of methods.

One method employs site-specific information to derive the translator. This is EPA's preferred approach since it is likely to result in the best estimate of actual in-stream partitioning relationships. However, since not all site-specific information was available, the base analysis presented in Chapter 4 used a second method, the theoretical partitioning relationship, to estimate the translator. The theoretical partitioning relationship is based on a partitioning coefficient determined empirically for each metal and, when available, the concentration of total suspended solids in the site-specific receiving water. According to recent EPA guidance on translators (The Metals Translator: Guidance for Calculation of a Total Recoverable Permit Limit From a Dissolved Criteria), this method usually tends to overstate the stringency of the derived permit limit compared to the site-specific method, although it will sometimes understate the stringency (U.S. EPA, 1996). A third method is to simply use the total recoverable criteria that are derived by dividing the dissolved criteria by the conversion factor. This method is very conservative and

will, in nearly all cases, result in more stringent permit limits compared to the site-specific method.

Although EPA encourages the use of site-specific translators, some members of the regulated community expressed concern that the state may not choose this approach to derive permit limits. Thus, EPA performed a sensitivity analysis.

A.2.1 Methodology

EPA performed a sensitivity analysis to estimate the effect of the use of total recoverable criteria on CTR-based WQBELs, total costs, and load reductions. EPA calculated CTR-based WQBELs using the same methods described in Chapter 4, except that it used total recoverable criteria in place of dissolved criteria for metals.

A.2.2 Results

The results of this analysis show that costs may be sensitive to the translator chosen by the state. **Exhibit A-2** shows the expected costs and load reductions using conversion factors as the translators.

Exhibit A-2. Comparison of Potential Costs if CTR-based WQBELS Are Calculated Using Criteria Expressed as Total Recoverable

Approach	Low Scenario			High Scenario		
	Estimated Annual Costs ($millions)	Load Reductions (10^6 lbs-eq/yr)	Cost-Effectiveness ($/lb-eq)	Estimated Annual Costs ($millions)	Load Reductions (10^6 lbs-eq/yr)	Cost-Effectiveness ($/lb-eq)
Baseline Cost Analysis	$33.5	1.08	31	$61.0	2.73	22
Alternative Analysis	$62.4	1.25	50	$325.0	2.94	111

Note: All costs are in first quarter 1998 dollars.

As Exhibit A-2 shows, a significant increase in costs can be expected, as compared to the costs of the theoretical partitioning approach used in the base analysis. Potential annual costs under the low scenario are $62.4 million per year, an approximately two-fold increase over the estimates in the low base analysis. Under the high-end scenario, total costs are estimated to be nearly $325 million per year, over five times the cost estimates in the base analysis. Potential load reductions are estimated to increase by approximately 14% over the low base-case scenario, and by nearly 7% under the high scenario. Using conversion factors as translators would result in significantly higher costs per toxic pound-equivalent removed than the base analysis. The cost-effectiveness of the new low scenario is $50 per toxic pound-equivalent removed compared to $31 per toxic pound-equivalent removed in the base analysis. The cost-effectiveness of the new high scenario is $111 per toxic pound-equivalent removed compared to $22 per toxic pound-

equivalent removed in the base analysis.

EPA believes that the costs estimated from this analysis greatly overstate true costs. EPA expects that in cases where a facility may incur substantial economic impacts due to an effluent limit for a metal, there will be strong incentives for the facility or the state to develop site-specific data, which will result in more realistic translators, thus reducing potential economic impacts. EPA believes that the cost estimates developed using the theoretical partitioning approach in the base case are more realistic than the cost estimates from this sensitivity analysis.

APPENDIX B. COMPLIANCE COST DECISION MATRIX

I. REASONABLE POTENTIAL

1. Does the pollutant have a reasonable potential to exceed water quality criteria?

No ☐ → No compliance costs.

☐ Yes

II. MODIFY/ADJUST EXISTING TREATMENT

1. Is the WQBEL for the pollutant above analytical detection levels?
2. Does the existing wastewater treatment system have the capability to treat/remove the pollutant?
3. Is the WQBEL for the pollutant greater than documented treatable levels?
4. Are modifications/adjustments to the existing wastewater treatment system feasible in light of the pollutant reduction necessary to achieve the WQBEL (i.e., is the reduction less than 10-25% of the current discharge levels)?

Yes ☐ → Facility incurs costs to modify/adjust existing treatment system.

☐ No

III. WASTE MINIMIZATION/POLLUTION PREVENTION

1. Is the production process or source generating the pollutant amenable to waste minimization/pollution prevention techniques?

Yes ☐ → Facility incurs costs to implement waste minimization/pollution prevention.

<u>Industrials Only</u>

2. Is the WQBEL for the pollutant above analytical detection levels?
   - If no, is the production process or pollutant source amenable to control techniques expected to reduce pollutant to below analytical detection levels (e.g., product substitution)?
3. Do any of the following conditions apply?:
   - Is the level of pollutant reduction required to meet the WQBEL insignificant (i.e., less than 10-25% of current discharge levels)?
   - Is the pollutant most often in compliance with the projected effluent limit? (i.e., 80% or more of the observations).
   - Are discharge monitoring data inconclusive to assume treatment costs? (e.g., no data exist, are limited or do not reflect existing discharge conditions).

<u>POTWs Only</u>

2. Is the WQBEL for the pollutant above analytical detection levels?
3. Do any of the following conditions apply?:
   - Is the level of pollutant reduction required to meet the WQBEL insignificant (i.e., less than 10-25% of current discharge levels)?
   - Is the pollutant most often in compliance with the projected effluent limit? (i.e., 80% or more of the observations).
   - Are discharge monitoring data inconclusive to assume treatment costs? (e.g., no data exist, are limited, old, or mostly below detection level).
4. Are increased industrial user/source controls feasible?

☐ No

IV. NEW/ADDITIONAL TREATMENT SYSTEM

1. Is the WQBEL for the pollutant above analytical detection levels?
2. Is the effluent concentration for the pollutant sufficiently documented above detection levels and above documented treatable levels?
3. Is the new/additional treatment technology feasible in light of the:
   - existing treatment process(es)?
   - production process(es)?
   - pollutant source(s)?
   - level of pollutant reductions required to achieve the WQBEL (i.e., is it greater than 10-25% of the current discharge levels)?
   - cost to add the necessary treatment? [Note: Under the low scenario, the cost trigger is $200/toxic lb-equivalent for a specific facility for a pollutant].

Yes ☐

Facility incurs costs to install additional end-of-pipe treatment (or in-plant treatment).

☐ No

V. OTHER CONTROLS

1. Is the pollutant concentration above analytical detection levels, and treatable levels; and is the WQBEL below analytical detection levels?
2. Is a combination of end-of-pipe treatment and waste minimization/pollution prevention feasible in light of the:
   - existing treatment process(es)?
   - pollutant source(s)?
   - level of pollutant reductions required to achieve the WQBEL (i.e., is it greater than 10-25% of the current discharge levels)?
   - cost to add the necessary treatment? [Note: Under the low scenario, the cost trigger is $200/toxic lb-equivalent for a specific facility for a pollutant].

Yes ☐

Facility incurs costs for other controls.

☐ No

VIa. Phased TMDL	VIb. Variances from Water Quality Standards	VIc. Site-Specific Criteria	VId. Change Designated Use	VIe. Alternative Mixing Zone
1. Is the discharge to a non-attainment receiving water? 2. Are the other sources of pollutants to the receiving water known?	1. Is the pollutant naturally occurring? 2. Are there natural, ephemeral, intermittent or low flow conditions? 3. Are there human-caused conditions or sources? 4. Are dams, diversions, or other types of hydrologic modifications present? 5. Do the physical conditions related to the natural features of the water body contribute? 6. Would the controls result in substantial and widespread economic and social impact? If yes, will the discharge comply with anti-degradation requirements and cause no increased risk to human health and the environment?	1. Are local environmental conditions not reflected in criteria? 2. Are bio-accumulation factors appropriate?	1. Is the pollutant naturally occurring? 2. Are there natural, ephemeral, intermittent or low flow conditions? 3. Are there human-caused conditions or sources? 4. Are dams, diversions, or other types of hydrologic modifications present? 5. Do the physical conditions related to the natural features of the water body contribute? 6. Would the controls result in substantial and widespread economic and social impact?	1. Does the receiving water body offer a dilution ratio higher than the one presently indicated in the permit?
Facility incurs future cost to comply with TMDL.	Facility incurs costs for preparing variance request and future compliance costs when variance expires.	Facility incurs costs for preparing request for site-specific criteria.	Facility incurs costs associated with preparing a use attainability analysis.	Facility incurs costs to prepare demonstration.

APPENDIX C. DETAILED COST ESTIMATES

Costs, Low, Extrapolated

Pollutant	Total Capital	Annual Capital	Mon	O&M	Total Waste Min.	Annual Waste Min.	Total TPO	Annual TPO	Total TS	Annual TS	Total PT Study	Annual PT Study	Total LL Eval	Annual LL Eval	Total Variance	Annual Variance	Total Other	Annual Other	Totals By Poll.	Percent of Total
Antimony (Sb)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
Arsenic (As)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
Cadmium (Cd)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
Chromium VI (Cr-VI)	0	0	0	0	0	0	1,076,524	153,558	0	0	0	0	0	0	0	0	0	0	153,558	1.5%
Copper (Cu)	0	0	0	0	4,748,214	676,039	5,771,000	1,248,793	0	0	0	0	0	0	1,676,190	238,652	0	0	2,163,484	21.8%
Lead (Pb)	0	0	0	0	0	0	575,000	81,867	0	0	0	0	0	0	0	0	0	0	81,867	0.8%
Mercury (Hg)	0	0	0	0	9,000,000	1,281,398	548,952	78,158	0	0	0	0	0	0	0	0	0	0	1,359,556	13.7%
Nickel (Ni)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
Selenium (Se)	0	0	0	0	0	0	518,667	87,789	0	0	0	0	0	0	0	0	0	0	87,789	0.9%
Silver (Ag)	0	0	0	0	1,850,000	263,398	1,165,619	165,958	0	0	0	0	0	0	0	0	0	0	429,356	4.3%
Thallium (Tl)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
Zinc (Zn)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,676,190	238,652	0	0	238,652	2.4%
1,2 Dichlorobenzene	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
1,2 Dichloroethane	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
1,2 Dichloropropane	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
1,2-Trans-Dichloroethylene	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
1,3 Dichlorobenzene	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
1,3-Dichloropropylene	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
1,4 Dichlorobenzene	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
2,4-Dinitrophenol	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
2,4,6 Trichlorophenol	0	0	0	0	462,500	65,850	0	0	0	0	0	0	0	0	0	0	0	0	65,850	0.7%
4,4'-DDD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
4,4'-DDT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
Aldrin	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
alpha-BHC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
alpha-Endosulfan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
Benzene	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
Benzo (a) Anthracene	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
Benzo (a) Fluoranthene	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
Benzo (k) Fluoranthene	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
beta-BHC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
beta-Endosulfan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
Bromoform	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
Butylbenzyl-phtalate	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
Carbon Tetrachloride	0	0	0	0	5,533,333	787,822	0	0	0	0	0	0	0	0	0	0	0	0	787,822	7.9%
Chlordane	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
Chlorobenzene	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
Chlorodibromomethane	0	0	0	0	0	0	4,221,111	600,991	0	0	0	0	0	0	0	0	0	0	600,991	6.1%
Chloroform	0	0	0	0	0	0	4,683,611	666,841	0	0	0	0	0	0	0	0	0	0	666,841	6.7%
Dichlorobromomethane	0	0	0	0	0	0	4,683,611	666,841	0	0	0	0	0	0	0	0	0	0	666,841	6.7%
Dieldrin	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
Di-n-Butyl Phthalate	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
Endosulfan Sulfate	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
Endrin	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
Endrin Aldehyde	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
Fluoranthene	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
Fluorene	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
gamma-BHC	0	0	0	0	4,462,500	635,350	0	0	0	0	0	0	0	0	0	0	0	0	635,350	6.4%
Heptachlor	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
Heptachlor epoxide	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
Hexachlorobenzene	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
Methylene chloride	0	0	0	0	5,533,333	787,822	0	0	0	0	0	0	0	0	0	0	0	0	787,822	7.9%
PCBs	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
Pentachlorophenol	0	0	0	0	462,500	65,850	0	0	0	0	0	0	0	0	0	0	0	0	65,850	0.7%
Phenol	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
TCDD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
Tetrachloroethylene	0	0	0	0	8,000,000	1,139,020	0	0	0	0	0	0	0	0	0	0	0	0	1,139,020	11.5%
Toluene	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
Toxaphene	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
Trichloroethylene	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%

Costs, High, Extrapolated

Pollutant	Total Capital	Annual Capital	Man	O&M	Total Waste Min.	Annual Waste Min.	Total TPO	Annual TPO	Total TS	Annual TS	Total PT Study	Annual PT Study	Total LL Eval	Annual LL Eval	Total Variance	Annual Variance	Total Other	Annual Other	Totals By Poll.	Percent of Total
Antimony (Sb)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
Arsenic (As)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
Cadmium (Cd)	0	0	0	0	7,904,762	1,125,450	0	0	0	0	0	0	0	0	0	0	0	0	1,125,450	2.2%
Chromium VI (Cr-VI)	0	0	0	0	11,854,762	1,687,851	3,312,964	471,692	0	0	0	0	0	0	0	0	0	0	2,159,543	4.2%
Copper (Cu)	4,777,143	680,158	0	418,000	27,468,310	3,913,432	749,302	106,684	0	0	0	0	0	0	0	0	0	0	5,118,275	10.1%
Lead (Pb)	0	0	0	0	11,916,508	1,698,490	959,337	136,645	0	0	0	0	0	0	0	0	0	0	4,835,135	9.4%
Mercury (Hg)	0	0	0	0	33,281,746	4,738,572	365,968	52,105	0	0	0	0	0	0	0	0	0	0	4,790,676	9.4%
Nickel (Ni)	4,777,143	680,158	0	418,000	8,521,429	1,213,280	961,298	136,867	0	0	0	0	0	0	0	0	0	0	2,448,285	4.8%
Selenium (Se)	0	0	0	0	12,163,095	1,731,751	961,298	136,867	0	0	0	0	0	0	0	0	0	0	1,868,618	3.7%
Silver (Ag)	4,777,143	680,158	0	418,000	25,279,762	3,599,269	3,678,933	523,797	0	0	0	0	0	0	0	0	0	0	5,221,224	10.3%
Thallium (Tl)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
Zinc (Zn)	4,777,143	680,158	0	418,000	698,413	99,438	0	0	0	0	0	0	0	0	0	0	0	0	1,197,596	2.4%
1,2 Dichlorobenzene	0	0	0	0	25,857,778	3,653,090	0	0	0	0	0	0	0	0	0	0	0	0	3,853,090	7.2%
1,2 Dichloroethane	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
1,2 Dichloropropane	0	0	0	0	0	0	2,470,867	351,767	0	0	0	0	0	0	0	0	0	0	351,767	
1,2-Trans-Dichloroethylene	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
1,3 Dichlorobenzene	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
1,3-Dichloropropylene	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
1,4 Dichlorobenzene	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
2,4-Dinitrophenol	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
2,4,6 Trichlorophenol	0	0	0	0	462,500	65,850	0	0	0	0	0	0	0	0	0	0	0	0	65,850	0.1%
4,4-DDD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
4,4-DDT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
Aldrin	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
alpha-BHC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
alpha-Endosulfan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
Benzene	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
Benzo (a) Anthracene	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
Benzo (a) Fluoranthene	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
Benzo (k) Fluoranthene	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
beta-BHC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
beta-Endosulfan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
Bromoform	0	0	0	0	326,786	46,527	0	0	0	0	0	0	0	0	0	0	0	0	46,527	0.1%
Butylbenzyl-phalate	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
Carbon Tetrachloride	0	0	0	0	18,771,230	2,672,601	0	0	0	0	0	0	0	0	0	0	0	0	2,672,601	5.3%
Chlordane	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
Chlorobenzene	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
Chlorodibromomethane	0	0	0	0	0	0	5,059,206	720,317	0	0	0	0	0	0	0	0	0	0	720,317	1.4%
Chloroform	0	0	0	0	8,158,786	1,161,343	4,683,611	666,841	0	0	0	0	0	0	0	0	0	0	1,828,659	3.6%
Dichlorobromomethane	0	0	0	0	326,786	46,527	4,683,611	666,841	0	0	0	0	0	0	0	0	0	0	713,368	1.4%
Dieldrin	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
Di-n-Butyl Phthalate	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
Endosulfan Sulfate	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
Endrin	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
Endrin Aldehyde	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
Fluoranthene	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
Fluorene	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
gamma-BHC	0	0	0	0	20,462,500	2,913,400	0	0	0	0	0	0	0	0	0	0	0	0	2,913,400	5.7%
Heptachlor	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
Heptachlor epoxide	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
Hexachlorobenzene	0	0	0	0	2,213,333	315,129	0	0	0	0	0	0	0	0	0	0	0	0	315,129	0.6%
Methylene chloride	0	0	0	0	18,444,444	2,626,074	0	0	0	0	0	0	0	0	0	0	0	0	2,626,074	5.2%
PCBs	0	0	0	0	5,728,571	815,620	0	0	0	0	0	0	0	0	0	0	0	0	815,620	1.6%
Pentachlorophenol	0	0	0	0	7,675,833	1,092,856	0	0	0	0	0	0	0	0	0	0	0	0	1,092,856	2.1%
Phenol	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
TCDD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
Tetrachloroethylene	0	0	0	0	40,326,786	5,741,627	0	0	0	0	0	0	0	0	0	0	0	0	5,741,627	11.3%
Toluene	0	0	0	0	10,252,024	1,459,658	0	0	0	0	0	0	0	0	0	0	0	0	1,459,658	2.9%
Toxaphene	0	0	0	0	326,786	46,527	0	0	0	0	0	0	0	0	0	0	0	0	46,527	0.1%
Trichloroethylene	0	0	0	0	326,786	46,527	0	0	0	0	0	0	0	0	0	0	0	0	46,527	0.1%

EXHIBIT "16"

Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California

(Phase 1 of the Inland Surface Waters Plan and the Enclosed Bays and Estuaries Plan)

2000

STATE WATER RESOURCES CONTROL BOARD

California Environmental Protection Agency

STATE WATER RESOURCES CONTROL BOARD
RESOLUTION NO. 2000 - 015

ADOPTION OF THE POLICY FOR THE IMPLEMENTATION OF TOXICS STANDARDS FOR INLAND SURFACE WATERS, ENCLOSED BAYS, AND ESTUARIES OF CALIFORNIA (PROPOSED POLICY)

WHEREAS:

1. Section 303(c)(2)(B) of the Federal Clean Water Act (CWA) requires that states adopt numeric criteria for priority pollutants as part of the states' water quality standards.

2. In 1991, the State Water Resources Control Board (SWRCB) adopted the Inland Surface Waters Plan (ISWP) and the Enclosed Bays and Estuaries Plan (EBEP), in part, to comply with CWA section 303(c)(2)(B). The SWRCB amended the plans in 1993.

3. In 1994, the SWRCB rescinded the ISWP and the EBEP in response to a court ruling invalidating the plans. Since then, California has been without statewide water quality standards for the majority of priority pollutants for the State's non-ocean surface waters.

4. After rescission of the plans, the SWRCB and the U.S. Environmental Protection Agency (U.S. EPA) agreed to pursue a collaborative approach to reestablish the regulatory framework of the rescinded ISWP and EBEP and to bring California into compliance with CWA section 303(c)(2)(B). This approach consists of two phases. In Phase 1, the U.S. EPA will promulgate numeric water quality criteria for priority pollutants for California in accordance with CWA section 303(c)(2)(B), and the SWRCB will adopt statewide measures to implement those criteria in a statewide policy. In Phase 2, the SWRCB will consider the adoption of appropriate statewide water quality objectives for toxic pollutants.

5. The U.S. EPA is scheduled to promulgate the final California Toxics Rule (CTR) (proposed at 62 Federal Register 42160-42208, August 5, 1997) to be codified at 40 Code of Federal Regulations section 131.38 in March or April 2000. The CTR will establish statewide water quality criteria for priority toxic pollutants for California.

6. The SWRCB may formulate and adopt State policy for water quality control in accordance with California Water Code sections 13140-13147.

7. The SWRCB prepared and circulated drafts of the Functional Equivalent Document (FED) for a proposed Policy to implement the draft CTR in accordance with the provisions of the California Environmental Quality Act (CEQA) and California Code of Regulations, title 14, section 15251(g), and title 23, sections 3775-3782, as follows:

a. The First Public Draft of the proposed Policy and FED was released for public review on September 11, 1997; a Supplement to the FED was released on October 16, 1997; and an Addendum to the Supplement was released on October 28, 1997..

b. The Second Public Draft of the proposed Policy and FED was released for public review on November 12, 1999; Appendix G to the 1999 FED (responses to public comments on the first draft Policy) was released on December 7, 1999.

c. The Third Public Draft of the proposed Policy was released for public review on January 24, 2000; the third draft of the FED was released for public review on January 31, 2000; Appendix G to the 2000 FED (responses to public comments on the second draft Policy) was released on February 11, 2000.

d. Supplement 1 to Appendix G to the November 12, 1999 FED and Appendix G to the January 31, 2000 FED were released on February 11, 2000.

e. Supplement 2 to Appendix G to the November 12, 1999 FED and Supplement to Appendix G to the January 31, 2000 FED will be released at the March 2, 2000 SWRCB Meeting.

8. The SWRCB has conducted public hearings in Sacramento on November 17, 1997 and in Newport Beach on December 3, 1997 and a public workshop in Sacramento on December 6, 1999 to solicit comments regarding the proposed Policy. The SWRCB has reviewed and carefully considered all comments received on the first, second, and third drafts of the proposed Policy and FED. The SWRCB considered the information contained in the FED prior to approval of the proposed Policy.

9. The SWRCB submitted the first and second drafts of the proposed Policy and FED for external scientific peer review of the scientific basis for the proposed Policy under the requirements of Health and Safety Code section 57004..

10. By letter dated January 21, 2000 from Alexis Strauss, Director of the Water Division at U.S. EPA, Region 9, to Walt Pettit, SWRCB Executive Director (January 21 letter), the U.S. EPA notified the SWRCB of the more important changes that U.S. EPA staff has proposed to the U.S. EPA Administrator for the final CTR. The SWRCB has reviewed the proposed CTR changes, and it finds that they do not require revisions to the proposed Policy or FED.

11. Further, the SWRCB does not anticipate that any additional changes to the final CTR will require the SWRCB to revise the adopted Policy (Policy) or final FED. If, however, the final CTR is substantially changed from the CTR as proposed and with the changes referenced in the January 21 letter, and if these changes will require revisions in the Policy or major revisions in the final FED, the SWRCB will reconsider the Policy.

12. In order to expedite the effective date of the Policy, the SWRCB has decided to adopt the Policy now, but to delay its effective date until the effective date of the CTR.

13. In addition, the regulatory provisions of the Policy will not become effective until they are approved by the Office of Administrative Law (OAL) in accordance with Government Code section 11349.3(a).

14. The SWRCB makes the following specific findings regarding its CEQA responsibilities:

    a. The Third Public Draft FED has been completed in compliance with CEQA (Public Resources Code section 21000 et seq.), the CEQA guidelines, and the procedures of the State of California for Certified Regulatory Programs (Public Resources Code section 21080.5, California Code of Regulations, title 14, sections 15250-15253, and title 23, sections 3775-3782); the SWRCB has reviewed and considered the Third Public Draft FED prior to its decision to approve the proposed Policy; and the Third Public Draft FED reflects the independent judgment of the SWRCB.

    b. The Third Public Draft FED identified potentially significant adverse environmental effects related to only one Policy provision. These potential effects stem from Policy provisions allowing RWQCB authorization of a longer compliance schedule where necessary to develop and implement a Total Maximum Daily Load (TMDL) and accompanying wasteload allocations and load allocations. As compared to the CTR, under the Policy dischargers could be allowed up to ten additional years to accommodate development of TMDLs. Adverse environmental effects could occur during this period because water quality standards for priority pollutants established to protect human health and aquatic life may not be met. Such potential adverse effects could occur to surface and ground water quality; endangered, threatened, or rare species; locally designated species or natural communities; wetland or other fish and wildlife habitat; human health; or recreational opportunities.

    c. The Policy contains provisions to lessen or avoid potentially significant adverse effects on the environment stemming from the TMDL compliance schedule provisions. These provisions include the following:

(1) The compliance schedule provisions are narrowly written to apply only to those situations where the discharger demonstrates that it is infeasible to achieve immediate compliance with the CTR criteria;

(2) The compliance schedule provisions do not apply to new discharges;

(3) The discharger must submit the following justification before compliance schedules may be authorized in a permit:

   (a) Documentation that diligent efforts have been made to quantify pollutant levels in the discharge and the sources of the pollutant in the waste stream, and the results of those efforts,

   (b) Documentation of source control and/or pollution minimization efforts currently underway or completed,

   (c) A proposed schedule for additional source control measures, pollutant minimization actions, or waste treatment (i.e., facility upgrades), and

   (d) A demonstration that the proposed schedule is as short as practicable;

(4) The schedule of compliance must be as short as practicable and must include specified required actions that demonstrate progress toward attainment of the CTR criterion or effluent limitation;

(5) Longer compliance schedules for TMDL development will be authorized only if the discharger has made appropriate commitments to support and expedite the development of the TMDL;

(6) If a compliance schedule is granted, the Policy requires that the Regional Water Quality Control Board (RWQCB) establish interim requirements and dates for their achievement in the National Pollutant Discharge Elimination System (NPDES) permit;

(7) If the compliance schedule exceeds one year, the RWQCB must establish limitations for the priority pollutant in the NPDES permit and may also impose interim requirements to control the pollutant, such as pollutant minimization and source control measures;

(8) Numeric limitations must be based on current treatment facility performance or existing NPDES permit limitations, whichever is more stringent; and

(9) The Policy requires each discharger to report, in writing, its compliance or noncompliance with the interim requirements. Both the interim requirements and reporting requirements are fully enforceable NPDES permit conditions.

d. Alternatives to the Policy provisions for TMDL-based compliance schedules for implementing the CTR identified in the FED are infeasible. These alternatives are discussed below:

Alternative 1. No Action. If the SWRCB does not adopt Policy provisions for compliance schedules for implementation of the CTR, compliance schedules for discharges which receive effluent limitations that are not based on TMDLs are substantially the same. Both the CTR and the Policy would allow compliance schedules of up to five years from NPDES permit issuance, reissuance, or modification with a maximum deadline of ten years from the effective date of the CTR or Policy, respectively. (It is anticipated that the Policy and CTR effective dates will differ only by a few weeks.) There is no significant difference in these time frames; therefore, no significant impacts to the environment would result.

Under this alternative, longer compliance schedules to coincide with TMDL schedules could not be authorized by the RWQCBs. The SWRCB finds that this is not a feasible alternative because eliminating these compliance schedules for TMDLs is unrealistic. Currently, over 500 water bodies are listed as impaired on the CWA section 303(d) list. More than 1400 impairments are cited for these waters. Existing U.S. EPA policy requires that the states develop schedules for TMDL development of up to 13 years, beginning with the 1998 lists. U.S. EPA has proposed, however, in draft TMDL regulations published in August 1999, that the states develop schedules for establishing TMDLs as expeditiously as practicable, but no later than 15 years from the date of the initial listing. The draft regulations also contemplate that each TMDL include an implementation plan containing a timeline, including interim milestones, for implementing control actions and management measures necessary to achieve the wasteload allocations and load allocations. The implementation plan also must include an estimate of the time required to achieve water quality standards. In the draft rule, U.S. EPA recognizes that relatively longer time frames may be necessary for problems that are extremely difficult to solve. The Policy's TMDL compliance schedule provisions are consistent with U.S. EPA's direction.

Alternatives 2-5. Adopt a compliance schedule of: up to 3 years from the effective date of the proposed Policy (Alternative 2); up to 10 years from the effective date of the proposed Policy (Alternative 3); up to 15 years from the effective date of the proposed Policy (Alternative 4); or up to 5 years from the date of permit issuance, reissuance, or modification (Alternative 5).

The SWRCB finds that these are not feasible alternatives for TMDL-based compliance schedules for the reasons explained under Alternative 1.

e. The SWRCB finds that there are no feasible alternatives or additional feasible mitigation measures available to the SWRCB that would substantially lessen any potentially significant adverse environmental effects associated with the Policy provisions authorizing longer compliance schedules for TMDLs.

f. The SWRCB has eliminated or substantially lessened all significant adverse effects on the environment associated with the Policy provisions authorizing longer compliance schedules for TMDLs. The remaining Policy provisions will not have a significant effect on the environment.

g. To the extent that the potential for any impacts remains associated with longer compliance schedules for TMDLs, the SWRCB finds that there are overriding considerations that outweigh any adverse environmental effects that may potentially occur due to the TMDL-based compliance schedules provisions of the Policy.

Implementing TMDLs for priority pollutants may result in greater overall improvements to water quality because all significant sources of a pollutant will be addressed. If a TMDL is under development, the discharger must still immediately comply with CTR-based effluent limitations if it is feasible to do so. If it is infeasible, the discharger must comply with RWQCB interim requirements that demonstrate progress toward meeting the CTR criterion or effluent limitation. The Policy provides that the RWQCB can impose requirements for source control and pollution minimization/prevention during the compliance schedule period. However, to require the discharger to install expensive treatment controls to comply with a CTR-based effluent limitation while the TMDL is under development could result in unnecessary costs and unnecessary secondary environmental effects due to construction of the treatment controls.

THEREFORE BE IT RESOLVED THAT:

The SWRCB:

1. Approves the FED for the proposed Policy.

2. Adopts the proposed Policy, provided that the Policy shall not go into effect unless and until the final CTR is effective and the regulatory provisions of the Policy have been approved by OAL in compliance with the Administrative Procedure Act.

3. Intends to reconsider the Policy if the final CTR is substantially changed from the CTR, as proposed and with the changes referenced in the January 21 letter, and if these changes require revisions in the Policy or major revisions in the final FED.

STATE WATER RESOURCES CONTROL BOARD
RESOLUTION NO. 2000 - 030

AMENDING RESOLUTION NO. 2000-15 REGARDING ADOPTION OF THE POLICY FOR THE IMPLEMENTATION OF TOXICS STANDARDS FOR INLAND SURFACE WATERS, ENCLOSED BAYS, AND ESTUARIES OF CALIFORNIA (PROPOSED POLICY)

WHEREAS:

1. On March 2, 2000, the State Water Resources Control Board (SWRCB), in Resolution No. 2000-15, adopted a Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California (Policy).

2. The Policy establishes implementation procedures for three categories of priority pollutant criteria or water quality objectives. These are priority pollutant: (1) criteria promulgated by the U.S. Environmental Protection Agency (U.S. EPA) in the National Toxics Rule that apply in California; (2) criteria proposed by U.S. EPA in the California Toxics Rule; and (3) water quality objectives contained in Regional Water Quality Control Board (RWQCB) water quality control plans (basin plans).

3. Under Resolution No. 2000-015, the Policy is effective when the Policy is approved by the Office of Administrative Law and the California Toxics Rule becomes effective.

4. U.S. EPA has experienced delays in promulgating the California Toxics Rule as a final rule.

5. Priority pollutant criteria in the National Toxics Rule and water quality objectives in RWQCB basin plans are currently in effect.

6. The SWRCB does not wish to delay implementation of the Policy with respect to applicable National Toxics Rule criteria and water quality objectives for priority pollutants.

THEREFORE BE IT RESOLVED THAT:

The SWRCB amends Resolution No. 2000-015 as follows:

1. Resolved No. 2 is deleted and replaced with:

   "2. Adopts the proposed Policy."

2. New Resolved Nos. 3 and 4 are added and existing Resolved Nos. 3 through 7 are renumbered accordingly:

"3. Provides that the Policy shall go into effect with respect to National Toxics Rule priority pollutant criteria that are applicable in California and priority pollutant water quality objectives in RWQCB basin plans upon approval by the Office of Administrative Law."

"4. Provides that the Policy shall go into effect with respect to California Toxics Rule criteria when the Policy is approved by the Office of Administrative Law and the California Toxics Rule becomes effective."

CERTIFICATION

The undersigned, Administrative Assistant to the Board, does hereby certify that the foregoing is a full, true, and correct copy of a resolution duly and regularly adopted at a meeting of the State Water Resources Control Board held on April 26, 2000.

Maureen Marché
Administrative Assistant to the Board

Table of Contents

Section — Page

Table of Contents i
Introduction 1
1 ESTABLISHING WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR PRIORITY POLLUTANT CRITERIA/OBJECTIVES 2
1.1 Applicable Priority Pollutant Criteria and Objectives 2
1.2 Data Requirements and Adjustments 3
1.3 Determination of Priority Pollutants Requiring Water Quality-Based Effluent Limitations 4
1.4 Calculation of Effluent Limitations 5
1.4.1 Translators for Metals and Selenium 12
1.4.2 Mixing Zones and Dilution Credits 13
1.4.2.1 Dilution Credits 13
1.4.2.2 Mixing Zone Conditions 15
1.4.3 Ambient Background Concentrations 16
1.4.3.1 Ambient Background Concentration as an Observed Maximum 16
1.4.3.2 Ambient Background Concentration as an Arithmetic Mean 16
1.4.4 Intake Water Credits 17
2 DETERMINING COMPLIANCE WITH PRIORITY POLLUTANT CRITERIA/ OBJECTIVES AND WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR PRIORITY POLLUTANT CRITERIA/OBJECTIVES 18
2.1 Compliance Schedules 19
2.1.1 TMDL-Based Compliance Schedule 20
2.2 Interim Requirements 20
2.2.1 Interim Requirements Under a Compliance Schedule 20
2.2.2 Interim Requirements for Providing Data 21
2.3 Monitoring Requirements 22
2.4 Reporting Requirements 23
2.4.1 Reporting Levels 23
2.4.2 Selection and Use of Appropriate Minimum Level (ML) Value 23
2.4.3 Deviation from MLs Listed in Appendix 4 24
2.4.4 Reporting Protocols 24
2.4.5 Compliance Determination 25
2.4.5.1 Pollutant Minimization Program 26
3 2,3,7,8-TCDD EQUIVALENTS 27
4 TOXICITY CONTROL PROVISIONS 28
5 SPECIAL PROVISIONS 30
5.1 Nonpoint Source Discharges 30
5.2 Site-Specific Objectives 30
5.3 Exceptions 32

Appendix 1	Definition of Terms	1-1
Appendix 2	Determination of Pollutants Requiring Water Quality-Based Effluent Limitations (flowchart)	2-1
Appendix 3	U.S. Environmental Protection Agency Conversion Factors	3-1
Appendix 4	Minimum Levels (MLs)	4-1
Appendix 5	Special Studies Guidance	5-1
Appendix 6	Watershed Management and TMDLs	6-1

POLICY FOR IMPLEMENTATION OF TOXICS STANDARDS FOR INLAND SURFACE WATERS, ENCLOSED BAYS, AND ESTUARIES OF CALIFORNIA

INTRODUCTION

This state policy for water quality control (Policy), adopted by the State Water Resources Control Board (SWRCB) on March 2, 2000 and effective by May 22, 2000 (See "Note" below), applies to discharges of toxic pollutants into the *inland surface waters, *enclosed bays, and *estuaries of California subject to regulation under the State's Porter-Cologne Water Quality Control Act (Division 7 of the Water Code) and the federal Clean Water Act (CWA). Such regulation may occur through the issuance of National Pollutant Discharge Elimination System (NPDES) permits, the issuance or waiver of waste discharge requirements (WDRs), or other relevant regulatory approaches.[1] The goal of this Policy is to establish a standardized approach for permitting discharges of toxic pollutants to non-*ocean surface waters in a manner that promotes statewide consistency. As such, this Policy is a tool to be used in conjunction with watershed management approaches and, where appropriate, the development of Total Maximum Daily Loads (TMDLs) to ensure achievement of water quality standards (i.e., water quality criteria or objectives, and the beneficial uses they are intended to protect, as well as the State and federal antidegradation policies).

This Policy establishes: (1) implementation provisions for priority pollutant criteria promulgated by the U.S. Environmental Protection Agency (U.S. EPA) through the National Toxics Rule (NTR)[2] (promulgated on December 22, 1992 and amended on May 4, 1995) and through the California Toxics Rule (CTR)[3], and for priority pollutant objectives established by Regional Water Quality Control Boards (RWQCBs) in their water quality control plans (basin plans)[4]; (2) monitoring requirements for 2,3,7,8-TCDD equivalents; and (3) chronic toxicity control provisions. In addition, this Policy includes special provisions for certain types of discharges and factors that could affect the application of other provisions in this Policy. With respect to nonpoint source discharges, only section 5.1 applies.

Note: This Policy was effective on April 28, 2000 with respect to the priority pollutant criteria promulgated for California by the U.S. EPA through the National Toxics Rule and to the priority pollutant objectives established by Regional Water Quality Control Boards in their water quality control plans (basin plans), with the exception of the provision on alternate test procedures in section 2.3., item (1). The alternate test procedures provision was effective on May 22, 2000. This Policy was effective on May 18, 2000 with respect to the priority pollutant criteria promulgated by the U.S. EPA through the California Toxics Rule.

[1] This Policy does not apply to discharges of toxic pollutants from combined sewer overflows. These discharges will continue to be regulated in accordance with the federal "Combined Sewer Overflow (CSO) Control Policy," published April 19, 1994 (59 Fed. Register 18688-18698). This Policy does not apply to regulation of storm water discharges. The SWRCB has adopted precedential decisions addressing regulation of municipal storm water discharges in Orders WQ 91-03, 91-04, 96-13, 98-01, and 99-05. The SWRCB has also adopted two statewide general permits regulating the discharge of pollutants contained in storm water from industrial and construction activities. See SWRCB Orders 99-08-DWQ and 97-03-DWQ.

[2] 40 CFR 131.36

[3] 65 Fed. Register 31682-31719 (May 18, 2000), adding Section 131.38 to 40 CFR.

[4] If a water quality objective and a CTR criterion are in effect for the same priority pollutant, the more stringent of the two applies.

With the exception of Appendix 5 (Special Studies) and Appendix 6 (Watershed Management and TMDLs), the provisions of this Policy have full regulatory effect. Appendix 5 is provided as guidance that may be followed in planning and conducting special studies that may be needed to implement the provisions of this Policy. Appendix 6 is provided as information on the role of watershed management approaches and TMDL development in achieving water quality standards.

Except as provided in section 4, this Policy supersedes basin plan provisions to the extent that (1) they apply to implementation of water quality standards for priority pollutants, and (2) they regard the same subject matter as that addressed in this Policy with respect to priority pollutant standards. For example, the Policy supersedes basin plan mixing zone provisions to the extent that they apply to implementation of water quality standards for priority pollutants.

Reference to a RWQCB also refers to SWRCB, where appropriate. Terms indicated with an asterisk (*) are defined in Appendix 1.

1.E STABLISHING WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR PRIORITY POLLUTANT CRITERIA/OBJECTIVES

The following sections address the issues of: (1) applicable priority pollutant criteria and objectives (section 1.1); (2) data requirements and adjustments (section 1.2); (3) determining priority pollutants requiring water quality-based effluent limitations (section 1.3); (4) calculating effluent limitations (section 1.4); (5) translators for metals and selenium (section 1.4.1); (6) mixing zones and dilution credits (section 1.4.2); (7) ambient background concentrations (section 1.4.3); and (8) intake water credits (section 1.4.4). Notwithstanding the provisions of these sections, effluent limitations must protect beneficial uses and comply with the State and federal antidegradation policies[5], federal antibacksliding requirements[6], and other applicable provisions of law.

1.1 Applicable Priority Pollutant Criteria and Objectives

Federal water quality criteria and State water quality objectives for priority pollutants have been established for non-ocean surface waters of California by the U.S. EPA and some RWQCBs, respectively. Federal priority pollutant criteria have been promulgated by the U.S. EPA in the 1992 NTR (amended in 1995) and in the 2000 CTR. For California, the criteria in the CTR supplement the criteria in the NTR (i.e., the CTR does not change or supersede any criteria previously promulgated for California in the NTR, but it does include them in the table of criteria for convenience). State priority pollutant objectives are contained in RWQCB basin plans.[4]

The RWQCB basin plans designate the beneficial uses that apply to the surface water bodies within their respective regions. Priority pollutant criteria/objectives are specifically established for the protection of aquatic life and human health beneficial uses designated in basin plans. Aquatic life criteria/objectives are established for fresh and salt waters. The CTR specifies the salinities to which the freshwater and saltwater criteria apply. The CTR also states that, except as specified in the CTR, the federal criteria apply to all waters assigned any aquatic life or human health use

---

5 SWRCB Resolution No. 68-16 (Statement of Policy with Respect to Maintaining High Quality of Waters in California), and 40 CFR 131.12 (revised as of July 1, 1996), respectively.

6 CWA Sections 402(o)(1) and 303(d)(4), and 40 CFR 122.44(l) and 40 CFR 122.62 (revised as of July 1, 1996).

designated in basin plans. It further states that the application of the criteria are based on the presence in all waters of some aquatic life designation and the presence or absence of the municipal and domestic supply (MUN) designation (i.e., the aquatic life criteria and the human health criteria for consuming water and organisms apply to MUN-designated water bodies; the aquatic life criteria and the human health criteria for consuming organisms only apply to non-MUN water bodies).

Designated beneficial uses to which aquatic life criteria or objectives would apply include, but are not necessarily limited to, warm freshwater habitat (WARM), cold freshwater habitat (COLD), and estuarine habitat (EST). Designated beneficial uses to which human health criteria/objectives would apply include, but are not necessarily limited to, municipal and domestic supply (MUN) and water contact recreation (REC1). Human health criteria/objectives are differentiated by whether organisms alone from the water body are consumed compared to whether both organisms and water from the water body are consumed. Where MUN is designated, the latter situation applies.

1.2 Data Requirements and Adjustments

The RWQCB shall issue Water Code Section 13267 or 13383 letters to all NPDES dischargers within their respective regions requiring the submittal of data sufficient to conduct the determination based on the analysis in section 1.3 and to calculate water quality-based effluent limitations in accordance with section 1.4 (excluding the development of a translator in accordance with section 1.4.1). The letter shall specify a time schedule for providing the data to the RWQCB that is as short as practicable but <u>not to exceed three years from the effective date of this Policy</u>. If the NPDES permit is reissued prior to completing the requirements, the schedule shall be included in the permit as interim requirements (in accordance with section 2.2.2). The permit shall be reopened to establish water quality-based effluent limitations, if necessary.

It is the discharger's responsibility to provide all data and other information requested by the RWQCB before the issuance, reissuance, or modification of a permit to the extent feasible. When implementing the provisions of this Policy, the RWQCB shall use all available, valid, relevant, representative data and information, as determined by the RWQCB. The RWQCB shall have discretion to consider if any data are inappropriate or insufficient for use in implementing this Policy. Instances where such consideration is warranted include, but are not limited to, the following: evidence that a sample has been erroneously reported or is not representative of effluent or ambient receiving water quality; questionable quality control/quality assurance practices; and varying seasonal conditions. The lack of a site-specific objective for a priority pollutant shall not be considered insufficient data.

When implementing the provisions of this Policy, the RWQCB shall ensure that criteria/objectives are properly adjusted for hardness or pH, if applicable, using the hardness or pH values for the receiving water, and that translators are appropriately applied (in accordance with section 1.4.1), if applicable. The RWQCB shall also ensure that pollutant and flow data are expressed in the appropriate forms and units for purposes of comparability and calculations.

1.3 Determination of Priority Pollutants Requiring Water Quality-Based Effluent Limitations

The RWQCB shall conduct the analysis in this section for each priority pollutant with an applicable criterion or objective, excluding priority pollutants for which a Total Maximum Daily Load (TMDL) has been developed, to determine if a water quality-based effluent limitation is required in the discharger's permit. It is the discharger's responsibility to provide all information requested by the RWQCB for use in the analysis. The RWQCB shall use all available, valid, relevant, representative information, as described in section 1.2, to determine whether a discharge may: (1) cause, (2) have a reasonable potential to cause, or (3) contribute to an excursion above any applicable priority pollutant criterion or objective. If the following analysis (which is depicted as a flowchart in Appendix 2) indicates that a limitation for a pollutant is required, the RWQCB shall establish the limitation in accordance with section 1.4.

Step 1: Identify applicable water quality criteria and objectives for priority pollutants as described in section 1.1. Determine the lowest (most stringent) water quality criterion or objective for the pollutant applicable to the receiving water (C). Adjust the criterion or objective, if applicable, as described in section 1.2. If it is necessary to express a dissolved metal or selenium criterion/objective as total recoverable and a site-specific translator has not yet been developed, as described in section 1.4.1, the RWQCB shall use the applicable U.S. EPA conversion factor (Appendix 3).

Step 2: Identify all effluent data for the pollutant as described in section 1.2 and proceed with *Step 3*. If effluent data are unavailable or insufficient, proceed with *Step 5*.

Step 3: Determine the observed maximum pollutant concentration for the effluent (MEC). If the pollutant was **not** detected in any of the effluent samples **and** any of the reported detection limits are below the C, use the lowest detection limit as the MEC and proceed with *Step 4*. If the pollutant was **not** detected in any of the effluent samples **and** all of the reported detection limits are greater than or equal to the C value, proceed with *Step 5*.

Step 4: Adjust the MEC from *Step 3*, if applicable, as described in section 1.2. Compare the MEC from *Step 3* or the adjusted MEC to the C from *Step 1*. If the MEC is greater than or equal to the C, an effluent limitation is required and the analysis for the subject pollutant is complete. If the MEC is less than the C, proceed with *Step 5*.

Step 5: Determine the observed maximum ambient background concentration for the pollutant (B) as described in section 1.4.3.1 and proceed with *Step 6*. If B data are unavailable or insufficient, proceed with *Step 7*.

Step 6: Adjust the B from *Step 5*, if applicable, as described in section 1.2. Compare the B from *Step 5* or the adjusted B to the C from *Step 1*. If the B is greater than the C, an effluent limitation is required and the analysis for the subject pollutant is complete. If the B is less than or equal to the C, proceed with *Step 7*.

Step 7: Review other information available to determine if a water quality-based effluent limitation is required, notwithstanding the above analysis in *Steps 1* through *6*, to protect beneficial uses.

Information that may be used includes: the facility type, the discharge type, solids loading analysis, lack of dilution, history of compliance problems, potential toxic impact of discharge, fish tissue residue data, water quality and beneficial uses of the receiving water, CWA 303(d) listing for the pollutant, the presence of endangered or threatened species or critical habitat, and other information. If data or other information is unavailable or insufficient to determine if a water quality-based effluent limitation is required, proceed with *Step 8.*

Step 8: If data are unavailable or insufficient to conduct the above analysis for the pollutant, or if all reported detection limits of the pollutant in the effluent are greater than or equal to the C value, the RWQCB shall establish interim requirements, in accordance with section 2.2.2, that require additional monitoring for the pollutant in place of a water quality-based effluent limitation. Upon completion of the required monitoring, the RWQCB shall use the gathered data to conduct the analysis in *Steps 1* through *7* above and determine if a water quality-based effluent limitation is required.

The RWQCB shall require periodic monitoring (at least once prior to the issuance and reissuance of a permit) for pollutants for which criteria or objectives apply and for which no effluent limitations have been established; however, the RWQCB may choose to exempt low volume discharges, determined to have no significant adverse impact on water quality, from this monitoring requirement.

1.4 Calculation of Effluent Limitations

When a RWQCB determines, using the procedures described in section 1.3, that water quality-based effluent limitations are necessary to control a priority pollutant in a discharge, the permit shall contain effluent limitations developed using one or more of the following methods:

A. If a TMDL is in effect, assign a portion of the loading capacity of the receiving water to each identified priority pollutant source of waste, point and nonpoint, based on the TMDL (see Appendix 6);

B. Use the following procedure based on a steady-state model:

   Step 1: For each priority pollutant identified in section 1.3, identify the applicable water quality criteria/objectives for the pollutant as described in section 1.1. Adjust the criterion or objective, if applicable, as described in section 1.2. If it is necessary to express a dissolved metal or selenium criterion/objective as total recoverable and a site-specific translator has not yet been developed, as described in section 1.4.1, the RWQCB shall use the applicable U.S. EPA conversion factor (Appendix 3). If data are insufficient to calculate the effluent limitation, the RWQCB shall establish interim requirements in accordance with section 2.2.2.

Step 2: For each water quality criterion/objective, calculate the effluent concentration allowance (*ECA*) using the following steady-state mass balance equation:

$ECA = C + D(C - B)$ when $C > B$, and
$ECA = C$ when $C \leq B$,

where C = the priority pollutant criterion/objective, adjusted (as described in section 1.2), if necessary, for hardness, pH, and translators (as described in section 1.4.1);
D = the dilution credit (as determined in section 1.4.2); and
B = the ambient background concentration. The ambient background concentration shall be the observed maximum as determined in accordance with section 1.4.3.1 with the exception that an *ECA* calculated from a priority pollutant criterion/objective that is intended to protect human health from carcinogenic effects shall use the ambient background concentration as an arithmetic mean determined in accordance with section 1.4.3.2.

The concentration units for *C* and *B* must be identical. Both *C* and *B* shall be expressed as total recoverable, unless inappropriate. The dilution credit is unitless.

Step 3: For each *ECA* based on an aquatic life criterion/objective, determine the long-term average discharge condition (*LTA*) by multiplying the *ECA* with a factor (multiplier) that adjusts for effluent variability. The multiplier shall be calculated as described below, or shall be found in Table 1. To use Table 1, the *coefficient of variation (*CV*) for the effluent pollutant concentration data must first be calculated. If (a) the number of effluent data points is less than ten, or (b) at least 80 percent of the data are reported as not detected, the *CV* shall be set equal to 0.6. When calculating *CV* in this procedure, if an effluent data point is below the detection limit for the pollutant in that sample, one-half of the detection limit shall be used as a value in the calculations. Multipliers for acute and chronic criteria/objectives that correspond to the *CV* can then be found in Table 1.

ECA Multipliers

$$\text{ECA multiplier}_{\text{acute}99} = e^{(0.5\sigma^2 - z\sigma)}$$

$$\text{ECA multiplier}_{\text{chronic}99} = e^{(0.5\sigma_4^2 - z\sigma_4)}$$

Where σ = *standard deviation
σ = $[ln(CV^2 + 1)]^{0.5}$
σ^2 = $ln(CV^2 + 1)$
σ_4 = $[ln(CV^2/4 + 1)]^{0.5}$
σ_4^2 = $ln(CV^2/4 + 1)$
z = 2.326 for 99th percentile probability basis

Table 1. Effluent Concentration Allowance (ECA) Multipliers for Calculating Long-Term Averages (LTAs)

Coefficient of Variation (CV)	Acute Multiplier	Chronic Multiplier
	99th Percentile Occurrence Probability	99th Percentile Occurrence Probability
0.1	0.797	0.891
0.2	0.643	0.797
0.3	0.527	0.715
0.4	0.440	0.643
0.5	0.373	0.581
0.6	0.321	0.527
0.7	0.281	0.481
0.8	0.249	0.440
0.9	0.224	0.404
1.0	0.204	0.373
1.1	0.187	0.345
1.2	0.174	0.321
1.3	0.162	0.300
1.4	0.153	0.281
1.5	0.144	0.264
1.6	0.137	0.249
1.7	0.131	0.236
1.8	0.126	0.224
1.9	0.121	0.214
2.0	0.117	0.204
2.1	0.113	0.195
2.2	0.110	0.187
2.3	0.107	0.180
2.4	0.104	0.174
2.5	0.102	0.168
2.6	0.100	0.162
2.7	0.098	0.157
2.8	0.096	0.153
2.9	0.094	0.148
3.0	0.093	0.144
3.1	0.091	0.141
3.2	0.090	0.137
3.3	0.089	0.134
3.4	0.088	0.131
3.5	0.087	0.128
3.6	0.086	0.126
3.7	0.085	0.123
3.8	0.084	0.121
3.9	0.083	0.119
4.0	0.082	0.117

LTA Equations

LTA_{acute} = ECA_{acute} * ECA $multiplier_{acute99}$ (from Table 1 or as calculated above)

$LTA_{chronic}$ = $ECA_{chronic}$ * ECA $multiplier_{chronic99}$ (from Table 1 or as calculated above)

Step 4: Select the lowest (most limiting) of the *LTA*s for the pollutant derived in *Step 3*.

Step 5: Calculate water quality-based effluent limitations (an *average monthly effluent limitation, AMEL, and a *maximum daily effluent limitation, MDEL) by multiplying the most limiting *LTA* (as selected in *Step 4*) with a factor (multiplier) that adjusts for the averaging periods and exceedance frequencies of the criteria/objectives and the effluent limitations, and the effluent monitoring frequency as follows:

$AMEL_{aquatic\ life}$ = *LTA* * AMEL $multiplier_{95}$ (from Table 2 or as calculated below)
$MDEL_{aquatic\ life}$ = *LTA* * MDEL $multiplier_{99}$ (from Table 2 or as calculated below)

The AMEL and MDEL multipliers shall be calculated as described below, or shall be found in Table 2 using the previously calculated *CV* and the monthly sampling frequency (*n*) of the pollutant in the effluent. If the sampling frequency is four times a month or less, *n* shall be set equal to 4. For this method only, maximum daily effluent limitations shall be used for publicly-owned treatment works (POTWs) in place of average weekly limitations.

AMEL and MDEL Multipliers

AMEL $multiplier_{95}$ = $e^{(z\sigma_n - 0.5\sigma_n^2)}$

Where σ_n = $[ln(CV^2/n + 1)]^{0.5}$
σ_n^2 = $ln(CV^2/n + 1)$
z = 1.645 for 95th percentile probability basis
n = number of samples per month

MDEL $multiplier_{99}$ = $e^{(z\sigma - 0.5\sigma^2)}$

Where σ = $[ln(CV^2 + 1)]^{0.5}$
σ^2 = $ln(CV^2 + 1)$
z = 2.326 for 99th percentile probability basis

Step 6: For the applicable human health criterion/objective, set the AMEL equal to the *ECA* (from *Step 2*).

$AMEL_{human\ health}$ = ECA

To calculate the MDEL for a human health criterion/objective, multiply the *ECA* by the ratio of the MDEL multiplier to the AMEL multiplier.

Table 2. Long-Term Average (LTA) Multipliers for Calculating Effluent Limitations

Coefficient of Variation	MDEL Multiplier	AMEL Multiplier			MDEL/AMEL Multiplier		
	99th Percentile Occurrence Probability	95th Percentile Occurrence Probability			MDEL = 99th Percentile AMEL = 95th Percentile Occurrence Probability		
(CV)		n = 4	n = 8	n = 30	n = 4	n = 8	n = 30
0.1	1.25	1.08	1.06	1.03	1.16	1.18	1.22
0.2	1.55	1.17	1.12	1.06	1.33	1.39	1.46
0.3	1.90	1.26	1.18	1.09	1.50	1.60	1.74
0.4	2.27	1.36	1.25	1.12	1.67	1.82	2.02
0.5	2.68	1.45	1.31	1.16	1.84	2.04	2.32
0.6	3.11	1.55	1.38	1.19	2.01	2.25	2.62
0.7	3.56	1.65	1.45	1.22	2.16	2.45	2.91
0.8	4.01	1.75	1.52	1.26	2.29	2.64	3.19
0.9	4.46	1.85	1.59	1.29	2.41	2.81	3.45
1.0	4.90	1.95	1.66	1.33	2.52	2.96	3.70
1.1	5.34	2.04	1.73	1.36	2.62	3.09	3.93
1.2	5.76	2.13	1.80	1.39	2.70	3.20	4.13
1.3	6.17	2.23	1.87	1.43	2.77	3.30	4.31
1.4	6.56	2.31	1.94	1.47	2.83	3.39	4.47
1.5	6.93	2.40	2.00	1.50	2.89	3.46	4.62
1.6	7.29	2.48	2.07	1.54	2.93	3.52	4.74
1.7	7.63	2.56	2.14	1.57	2.98	3.57	4.85
1.8	7.95	2.64	2.20	1.61	3.01	3.61	4.94
1.9	8.26	2.71	2.27	1.64	3.05	3.65	5.02
2.0	8.55	2.78	2.33	1.68	3.07	3.67	5.09

Notes:
n = monthly sampling frequency of the effluent concentration data.

Table 2 continued.

Coefficient of Variation	MDEL Multiplier	AMEL Multiplier			MDEL/AMEL Multiplier		
	99th Percentile Occurrence Probability	95th Percentile Occurrence Probability			MDEL = 99th Percentile AMEL = 95th Percentile Occurrence Probability		
(CV)		n = 4	n = 8	n = 30	n = 4	n = 8	n = 30
2.1	8.83	2.85	2.39	1.72	3.10	3.70	5.14
2.2	9.09	2.91	2.45	1.75	3.12	3.72	5.19
2.3	9.34	2.97	2.50	1.79	3.15	3.73	5.22
2.4	9.58	3.03	2.56	1.82	3.17	3.74	5.25
2.5	9.81	3.08	2.61	1.86	3.18	3.75	5.27
2.6	10.0	3.13	2.67	1.90	3.20	3.76	5.29
2.7	10.2	3.18	2.72	1.93	3.22	3.76	5.30
2.8	10.4	3.23	2.77	1.97	3.23	3.77	5.30
2.9	10.6	3.27	2.82	2.00	3.25	3.77	5.30
3.0	10.8	3.31	2.86	2.04	3.26	3.77	5.30
3.1	11.0	3.35	2.91	2.07	3.27	3.77	5.29
3.2	11.1	3.38	2.95	2.11	3.29	3.77	5.28
3.3	11.3	3.42	2.99	2.14	3.30	3.77	5.27
3.4	11.4	3.45	3.03	2.17	3.31	3.77	5.25
3.5	11.6	3.48	3.07	2.21	3.32	3.77	5.24
3.6	11.7	3.51	3.10	2.24	3.33	3.76	5.22
3.7	11.8	3.53	3.14	2.27	3.34	3.76	5.20
3.8	11.9	3.56	3.17	2.30	3.35	3.76	5.18
3.9	12.1	3.58	3.21	2.34	3.36	3.76	5.16
4.0	12.16	3.60	3.24	2.37	3.37	3.76	5.14

Notes:
n = monthly sampling frequency of the effluent concentration data.

$$\text{MDEL/AMEL multiplier} = \text{MDEL multiplier}_{99} \div \text{AMEL multiplier}_{95}$$

$$\text{MDEL}_{\text{human health}} = \text{ECA} * \text{MDEL/AMEL multiplier}$$

Step 7: Identify the lower of (1) the AMEL and MDEL calculated based on the aquatic life criteria/objectives, and (2) the AMEL and MDEL calculated based on the human health criterion/objective.

C. Apply a *dynamic model, approved by the RWQCB, where sufficient effluent and receiving water data exist; or

D. Establish effluent limitations that consider intake water pollutants according to section 1.4.4.

The RWQCB shall impose more restrictive water quality-based effluent limitations (e.g., discharge prohibitions established in accordance with Water Code Section 13243) where necessary for the protection of beneficial uses or where otherwise required by law.[7] Seasonal effluent limitations may be established, where appropriate (such as in applying translators and mixing zones/dilution credits). Any significant change in effluent quantity or quality shall be cause for reevaluation of effluent limitations.

Regardless of which method is used for deriving water quality-based effluent limitations, the calculated water quality-based effluent limitations shall be compared to the technology-based effluent limitations for the pollutant, and the most protective of the two types of limitations shall be included in the permit.

Effluent limitations shall apply to the total effluent of a waste discharge at the end-of-pipe, except in the rare situations where it is impractical or infeasible (e.g., where the final discharge point is inaccessible, or the pollutants are so diluted by cooling water as to make monitoring impractical, or interferences among pollutants make analysis infeasible). In these cases, some effluent limitations and monitoring requirements for the discharge may be modified to apply to internal waste streams instead, provided that the permit fact sheet fully states the circumstances for allowing this to occur and the permit also contains the unmodified effluent limitations (see 40 CFR 122.45(h), revised as of July 1, 1996).

For pollutants that are so diluted by cooling water as to make monitoring impractical, effluent limitations for internal waste streams shall be based on the same averaging periods as the unmodified effluent limitations and shall be calculated as follows:

[7] For example, to implement the State and federal antidegradation policies, and the federal antibacksliding requirements.

$$IL = EL + (EL - CC) * CF/IF$$
$$IL = EL + (EL - CC) * (EF - IF)/IF$$

where IL = the limitation for the internal waste stream;
EL = the unmodified effluent limitation;
CC = the concentration of the pollutant in the cooling water;
CF = the cooling water flow, which is equal to the effluent flow minus the internal waste stream flow;
IF = the internal waste stream flow; and
EF = the effluent flow.

These equations do not apply when intake water credits (as described in section 1.4.4) are being provided.

1.4.1 Translators for Metals and Selenium

To derive total recoverable effluent limitations for aquatic life metals and selenium criteria/objectives that are expressed in the dissolved form, a translator first must be applied to the criterion/objective to express it as total recoverable. The translator shall be the U.S. EPA conversion factor (see Appendix 3) that applies to the dissolved aquatic life metals criterion as specified in the CTR (i.e., the dissolved criterion/objective would be divided by the applicable U.S. EPA conversion factor to calculate a total recoverable criterion) unless:

A. the discharger, in the permit application, (1) commits to (a) completing a defensible site-specific translator study and (b) proposing a dissolved to total recoverable translator to the RWQCB, and (2) describes the method(s) to be used in developing the translator; and

B. the discharger, within a time period specified by the RWQCB not exceeding two years from the date of issuance/reissuance of the permit, submits to the RWQCB (1) the proposed translator, and (2) all data and calculations related to its derivation.

Site-specific translators can be developed from field data by either direct determination of the fraction dissolved, or by development of a site-specific partition coefficient that relates the fraction dissolved to ambient background conditions such as pH, suspended load, or organic carbon. The fraction of metal that is dissolved in a water body can vary depending on when and where measurements are taken. A site-specific translator must (1) account for spatial and/or seasonal variability in areas of the water body that are affected by the discharger's effluent and (2) protect against toxic effects during critical conditions. The translator shall be derived using the *median of data for translation of chronic criteria and the *90th percentile of observed data for translation of acute criteria. If systematic seasonal variation in the translator is demonstrated, seasonal effluent limitations may be justified. If a spatial gradient in the translator is demonstrated, the highest translator value should be used unless the permit allows for a mixing zone (in accordance with section 1.4.2), in which case measurements should be taken outside the mixing zone. The site-specific study plan (including sampling design) must be approved by the RWQCB, after consultation with the California Department of Fish and Game, prior to conducting the study. Translator studies may be conducted by one or more dischargers

discharging to the same receiving water body, as described in the permit application, subject to approval by the RWQCB. The planning and undertaking of the study may follow the guidelines presented in Appendix 5, as applicable.

Alternatively, the RWQCB may consider applying a previously approved site-specific translator or translator based on a study completed prior to the adoption of this Policy if the RWQCB believes the translator adequately reflects existing conditions (including spatial and/or seasonal variability) in the areas of the water body affected by the discharger's effluent.

While a translator study is being conducted, a final effluent limitation based on the applicable U.S. EPA conversion factor shall be included in the provisions of the permit and interim requirements shall be established (in accordance with section 2.2.2). An interim deadline to submit the results of the study shall be specified by the RWQCB, and shall not exceed two years from the date of issuance/reissuance of the permit. Once the translator is developed by the discharger(s) and approved by the RWQCB, the RWQCB shall reopen the permit and a new effluent limitation shall be calculated using a method described in section 1.4 after adjusting the dissolved metal or selenium criterion/objective by dividing it by the translator. In the event a translator study is not completed within the specified time, the U.S. EPA conversion factor-based effluent limitation in the provisions of the permit shall become effective as a default limitation.

1.4.2 Mixing Zones and Dilution Credits

With the exception of effluent limitations derived from TMDLs, in establishing and determining compliance with effluent limitations for applicable human health, acute aquatic life, or chronic aquatic life priority pollutant criteria/objectives or the toxicity objective for aquatic life protection in a RWQCB basin plan, the RWQCB may grant *mixing zones and *dilution credits to dischargers in accordance with the provisions of this section. To the extent permitted by applicable law, mixing zones may be considered for TMDL-derived effluent limitations. Effluent limitations based on a TMDL shall meet the mixing zone conditions specified in section 1.4.2.2.A.

The applicable priority pollutant criteria and objectives are to be met throughout a water body except within any mixing zone granted by a RWQCB. The allowance of mixing zones is discretionary and shall be determined on a discharge-by-discharge basis. A RWQCB may consider allowing mixing zones and dilution credits only for discharges with a physically identifiable point of discharge that are regulated through an NPDES permit issued by the RWQCB.

1.4.2.1 Dilution Credits

The dilution credit, D, is a numerical value associated with the mixing zone that accounts for the receiving water entrained into the discharge. The dilution credit is a value used in the calculation of effluent limitations (described in section 1.4). Dilution credits may be limited or denied on a pollutant-by-pollutant basis, which may result in a dilution credit for all, some, or no priority pollutants in a discharge.

Before establishing a mixing zone and a dilution credit for a discharge, it must first be determined if, and how much (if any), receiving water is available to dilute the discharge. In determining the appropriate available receiving water flow, the RWQCBs may take into account actual and seasonal variations of the receiving water and the effluent. For example, a RWQCB may prohibit mixing zones during seasonal low flows and allow them during seasonal high flows. However, for year-round mixing zones, the mixing zone and dilution credit shall be determined using the parameters specified in Table 3.

Table 3. Effluent and Receiving Water Flows for Calculating Dilution Ratios

In calculating a dilution ratio for:	Use the critical receiving water flow[8] of:	Use the discharged effluent flow of:
Acute aquatic life criteria/objectives	*1Q10	*maximum daily flow during period of discharge
Chronic aquatic life criteria/objectives Chronic toxicity objective for aquatic life[9]	*7Q10	*four-day average of daily maximum flows during period of discharge
Human health criteria/objectives	*harmonic mean	*long-term arithmetic mean flow during period of discharge

The approach to making a mixing zone determination also depends on whether a discharge is *completely-mixed or *incompletely-mixed with the receiving water as discussed below.

Completely-Mixed Discharges

For completely-mixed discharges, as determined by the RWQCB and based on information provided by the discharger, the amount of receiving water available to dilute the effluent shall be determined by calculating the *dilution ratio (i.e., the critical receiving water flow divided by the effluent flow) using the appropriate flows in Table 3. In no case shall the RWQCB grant a dilution credit that is greater than the calculated dilution ratio. The dilution credit may be set equal to the dilution ratio only if the site-specific conditions concerning the discharge and the receiving water do not indicate that a smaller dilution credit is necessary to protect beneficial uses and meet the conditions of this Policy. If, however, dilution ratios that are calculated using the Table 3 parameters are inappropriate for use due to site-specific issues, the mixing zone and dilution credit shall be determined using site-specific information and procedures detailed for incompletely-mixed discharges.

---

[8] U.S. EPA's *biologically-based receiving water flows may be used in place of these critical receiving water flows where sufficient data are available.

[9] These objectives are included in RWQCB basin plans and may address both chronic and acute toxicity to aquatic life. The flows in Table 3 apply to the chronic component of the objective.

Incompletely-Mixed Discharges

Dilution credits and mixing zones for incompletely-mixed discharges shall be considered by the RWQCB only after the discharger has completed an independent mixing zone study and demonstrated to the satisfaction of the RWQCB that a dilution credit is appropriate. Mixing zone studies may include, but are not limited to, tracer studies, dye studies, modelling studies, and monitoring upstream and downstream of the discharge that characterize the extent of actual dilution. These studies may be conducted in accordance with the procedures outlined in Appendix 5.

1.4.2.2 Mixing Zone Conditions

A mixing zone shall be as small as practicable. The following conditions must be met in allowing a mixing zone:

A. A mixing zone shall not:

(1) compromise the integrity of the entire water body;
(2) cause *acutely toxic conditions to aquatic life passing through the mixing zone;
(3) restrict the passage of aquatic life;
(4) adversely impact biologically sensitive or critical habitats, including, but not limited to, habitat of species listed under federal or State endangered species laws;
(5) produce undesirable or nuisance aquatic life;
(6) result in floating debris, oil, or scum;
(7) produce objectionable color, odor, taste, or turbidity;
(8) cause *objectionable bottom deposits;
(9) cause nuisance;
(10) dominate the receiving water body or overlap a mixing zone from different outfalls; or
(11) be allowed at or near any drinking water intake. A mixing zone is not a *source of drinking water. To the extent of any conflict between this determination and the Sources of Drinking Water Policy (SWRCB Resolution No. 88-63), this determination supersedes the provisions of that policy.

B. The RWQCB shall deny or significantly limit a mixing zone and dilution credit as necessary to protect beneficial uses, meet the conditions of this Policy, or comply with other regulatory requirements. Such situations may exist based upon the quality of the discharge, hydraulics of the water body, or the overall discharge environment (including water column chemistry, organism health, and potential for bioaccumulation). For example, in determining the extent of or whether to allow a mixing zone and dilution credit, the RWQCB shall consider the presence of pollutants in the discharge that are *carcinogenic, *mutagenic, *teratogenic, *persistent, *bioaccumulative, or attractive to aquatic organisms. In another example, the RWQCB also shall consider, if necessary to protect the beneficial uses, the level of flushing in water bodies such as lakes, reservoirs, enclosed bays, estuaries, or other water body types

where pollutants may not be readily flushed through the system. In the case of multiple mixing zones, proximity to other outfalls shall be carefully considered to protect the beneficial uses.

If a RWQCB allows a mixing zone and dilution credit, the permit shall specify the method by which the mixing zone was derived, the dilution credit granted, and the point(s) in the receiving water where the applicable criteria/objectives must be met. The application for the permit shall include, to the extent feasible, the information needed by the RWQCB to make a determination on allowing a mixing zone, including the calculations for deriving the appropriate receiving water and effluent flows, and/or the results of a mixing zone study. If the results of the mixing zone study are unavailable by the time of permit issuance/reissuance, the RWQCB may establish interim requirements in accordance with section 2.2.2.

1.4.3 Ambient Background Concentrations

Ambient background concentration, B, of a priority pollutant in the receiving water body shall be calculated on a pollutant-by-pollutant basis and on a discharge-by-discharge or water body-by-water body basis at the RWQCB's discretion. The ambient background concentration shall be the observed maximum ambient water column concentration in accordance with section 1.4.3.1 or the *arithmetic mean of observed ambient water concentrations in accordance with section 1.4.3.2 where these sections are specifically referenced in this Policy (i.e., sections 1.3 and 1.4).

1.4.3.1 Ambient Background Concentration as an Observed Maximum

Step 1: Identify all available, applicable ambient background data for the pollutant in accordance with section 1.2. If possible, preference should be given to ambient water column concentrations measured immediately upstream or near the discharge, but not within an allowed mixing zone for the discharge. The RWQCB shall have discretion to consider if any samples are invalid for use as applicable data due to evidence that the sample has been erroneously reported or the sample is not representative of the ambient receiving water column that will mix with the discharge. For example, the RWQCB shall have discretion to consider samples to be invalid that have been taken during peak flows of significant storm events.

Step 2: If all samples are below the reported detection limits, the ambient background concentration shall be set equal to the lowest of the individual reported detection limits. If any sample is reported with a detected concentration, as either measured or estimated by the laboratory, the ambient background concentration shall be set equal to the maximum of the individual reported measured or estimated concentrations.

1.4.3.2 Ambient Background Concentration as an Arithmetic Mean

Step 1: Identify all available, applicable ambient background data for the pollutant in accordance with section 1.2. If possible, preference should be given to ambient water column concentrations measured immediately upstream or near the discharge, but not within an allowed mixing zone for

the discharge. The RWQCB shall have discretion to consider if any samples are invalid for use as applicable data due to evidence that the sample has been erroneously reported or the sample is not representative of the ambient receiving water column that will mix with the discharge.

Step 2: If all samples are below the reported detection limits, the ambient background concentration shall be set equal to the lowest of the individual reported detection limits. If any sample is reported with a detected concentration, as either measured or estimated by the laboratory, the ambient background concentration shall be set equal to the arithmetic mean of the individual reported measured or estimated concentrations. The arithmetic mean shall be calculated using the reported detection limits for samples that are reported below detection limits.

1.4.4 Intake Water Credits

A RWQCB may consider priority pollutants in intake water on a pollutant-by-pollutant and discharge-by-discharge basis when establishing water quality-based effluent limitations, provided that the discharger has demonstrated to the satisfaction of the RWQCB that the following conditions are met:

(1) The observed maximum ambient background concentration, as determined in section 1.4.3.1, and the intake water concentration of the pollutant exceed the most stringent applicable criterion/objective for that pollutant;

(2) The intake water credits provided are consistent with any TMDL applicable to the discharge that has been approved by the RWQCB, SWRCB, and U.S. EPA;

(3) The intake water is from the same water body as the receiving water body. The discharger may demonstrate this condition by showing that:

   (a) the ambient background concentration of the pollutant in the receiving water, excluding any amount of the pollutant in the facility's discharge, is similar to that of the intake water;

   (b) there is a direct hydrological connection between the intake and discharge points;

   (c) the water quality characteristics are similar in the intake and receiving waters; and

   (d) the intake water pollutant would have reached the vicinity of the discharge point in the receiving water within a reasonable period of time and with the same effect had it not been diverted by the discharger.

   The RWQCB may also consider other factors when determining whether the intake water is from the same water body as the receiving water body;

(4) The facility does not alter the intake water pollutant chemically or physically in a manner that adversely affects water quality and beneficial uses; and

(5) The timing and location of the discharge does not cause adverse effects on water quality and beneficial uses that would not occur if the intake water pollutant had been left in the receiving water body.

Where the above conditions are met, the RWQCB may establish effluent limitations allowing the facility to discharge a mass and concentration of the intake water pollutant that is no greater than the mass and concentration found in the facility's intake water. A discharger may add mass of the pollutant to its waste stream if an equal or greater mass is removed prior to discharge, so there is no net addition of the pollutant in the discharge compared to the intake water. Where proper operation and maintenance of a facility's treatment system results in the removal of an intake water pollutant, the RWQCB may establish limitations that reflect the lower mass and concentration of the pollutant achieved by such treatment.

Where intake water for a facility is provided by a municipal water supply system and the supplier provides treatment of the raw water that removes an intake water pollutant, the concentration of the intake water pollutant shall be determined at the point where the water enters the water supplier's distribution system.

Where a facility discharges pollutants from multiple sources that originate from the receiving water body and from other water bodies, the RWQCB may derive an effluent limitation reflecting the flow-weighted amount of each source of the pollutant provided that adequate monitoring to determine compliance can be established and is included in the permit. When calculating the flow-weighted effluent limitation, the pollutant from the receiving water body shall be assumed to have a concentration that is no greater than the concentration in the facility's intake water; the same pollutant from other sources shall be assumed to have a concentration that is no greater than the most stringent applicable criterion/objective.

The permit shall specify how compliance with mass- and concentration-based limitations for the intake water pollutant will be assessed. This may be done by basing the effluent limitation on ambient background concentration data. Alternatively, the RWQCB may determine compliance by simultaneously monitoring the pollutant concentrations in the intake water and in the effluent. This monitoring may be supplemented by monitoring internal waste streams or by a RWQCB evaluation of the use of *best management practices.

2.DE TERMINING COMPLIANCE WITH PRIORITY POLLUTANT CRITERIA/OBJECTIVES AND WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR PRIORITY POLLUTANT CRITERIA/OBJECTIVES

Compliance with priority pollutant criteria/objectives and water quality-based effluent limitations established pursuant to section 1 shall be determined according to the following provisions for (1) compliance schedules (section 2.1), (2) interim requirements (section 2.2), (3) monitoring requirements (section 2.3), and (4) reporting requirements including compliance determinations (section 2.4). In determining compliance with effluent limitations based on intake water credits, only the monitoring requirements (section 2.3) and the reporting requirements (section 2.4) apply. In determining compliance with effluent limitations derived from TMDLs, only the compliance schedule provisions (section 2.1) apply.

2.1 Compliance Schedules

Based on an *existing discharger's request and demonstration that it is *infeasible for the discharger to achieve immediate compliance with a CTR criterion[10], or with an effluent limitation based on a CTR criterion, the RWQCB may establish a compliance schedule in an NPDES permit. Compliance schedules shall not be allowed in permits for *new dischargers.

A schedule of compliance shall include a series of required actions to be undertaken for the purpose of achieving a CTR criterion and/or effluent limitations based on a CTR criterion. These actions shall demonstrate reasonable progress toward the attainment of a CTR criterion and/or effluent limitations. The compliance schedule shall include a schedule for completion that reflects a realistic assessment of the shortest practicable time required to perform each task. The compliance schedule shall contain a final compliance date based on the shortest practicable time required to achieve compliance. The deadlines to complete each action in the compliance schedule shall be specified in the NPDES permit and shall be accompanied by interim requirements as described in section 2.2.1. When a compliance schedule exceeds one year from the date of permit issuance, interim limitations with specific compliance dates (as described in section 2.2.1) shall be included in the NPDES permit. If the final compliance date extends beyond the permit term, the final compliance date and supporting explanation shall be included in the permit findings.

The discharger shall submit to the RWQCB the following justification before compliance schedules may be authorized in a permit: (a) documentation that diligent efforts have been made to quantify pollutant levels in the discharge and the sources of the pollutant in the waste stream, and the results of those efforts; (b) documentation of source control and/or pollution minimization efforts currently underway or completed; (c) a proposed schedule for additional or future source control measures, *pollutant minimization actions, or waste treatment (i.e., facility upgrades); and (d) a demonstration that the proposed schedule is as short as practicable.

The schedule of compliance for point source dischargers in an NPDES permit shall be as short as practicable but in no case exceed the following:

A. Up to <u>five</u> years <u>from the date of permit issuance, reissuance, or modification</u> to complete actions (such as pollutant minimization or facility upgrades) necessary to comply with CTR criterion-based effluent limitations that are derived with or without a TMDL. Such actions shall include the development and adoption of a site-specific objective, if appropriate, as provided in section 5.2.

B. Up to <u>15</u> years <u>from the effective date of this Policy</u> to develop and adopt a TMDL, and accompanying Waste Load Allocations (WLAs) and Load Allocations (LAs), as described in section 2.1.1, below.

In no case (unless an exception has been granted in accordance with section 5.3) shall a compliance schedule for these dischargers exceed, from the effective date of this Policy: (a) 10 years to establish and comply with CTR criterion-based effluent limitations; or (b) 20 years

[10] CTR criteria, for purposes of this section, exclude NTR criteria.

to develop and adopt a TMDL, and to establish and comply with WLAs derived from a TMDL for a CTR criterion (i.e., up to 15 years to complete the TMDL and up to five years to comply with a TMDL-derived effluent limitation).

2.1.1 TMDL-Based Compliance Schedule

The compliance schedule provisions for the development and adoption of a TMDL only apply when: (a) the discharger requests and demonstrates that it is *infeasible for the discharger to achieve immediate compliance with a CTR criterion, or with an effluent limitation based on a CTR criterion; and (b) the discharger has made appropriate commitments to support and expedite the development of the TMDL. In determining appropriate commitments, the RWQCB should consider the discharge's contribution to current loadings and the discharger's ability to participate in TMDL development.

For *bioaccumulative priority pollutants for which the receiving water has been included on the CWA Section 303(d) list, the RWQCB should consider whether the mass loading of the bioaccumulative pollutant(s) should be limited to representative, current levels pending TMDL development in order to implement the applicable water quality standard.

2.2 Interim Requirements

If a compliance schedule is allowed (in accordance with section 2.1) or a schedule is allowed to collect and provide data needed to establish water quality-based effluent limitations for a CTR criterion (in accordance with provisions in section 1), interim requirements shall be included in an NPDES permit.

2.2.1 Interim Requirements Under a Compliance Schedule

If a compliance schedule is granted (in accordance with section 2.1), the RWQCB shall establish interim requirements and dates for their achievement in the NPDES permit. If the compliance schedule exceeds one year, the RWQCB shall establish interim numeric limitations for the priority pollutant in the permit and may also impose interim requirements to control the pollutant, such as *pollutant minimization and source control measures. Numeric interim limitations for the pollutant must be based on current treatment facility performance or on existing permit limitations, whichever is more stringent. If the existing permit limitations are more stringent, and the discharger is not in compliance with those limitations, the noncompliance under the existing permit must be addressed through appropriate enforcement action before the permit can be reissued, unless antibacksliding provisions are met.

There shall be no more than one year between interim dates. The interim requirements shall state that the discharger must notify the RWQCB, in writing, no later than 14 days following each interim date, of its compliance or noncompliance with the interim requirements.

If the compliance schedule is within the term of the permit, the final effluent limitations shall be included in the permit provisions. If the compliance schedule exceeds the length of the permit, the final effluent limitations shall be included in the permit findings. In the latter case, the findings shall include: (1) the water quality to be achieved; (2) the reason that a final water quality-based

effluent limitation is not being incorporated into the permit as an enforceable limitation at this time; (3) a statement that it is the intent of the RWQCB to include, in a subsequent permit revision, the final water quality-based effluent limitation as an enforceable limitation (based either on the CTR criterion directly or on future regulatory developments, such as TMDL or site-specific objective development). The permit findings shall also state the appropriate enforcement actions that may be taken by the RWQCB if interim limitations and requirements are not met.

2.2.2 Interim Requirements for Providing Data

The RWQCB may determine, based on a discharger's request and/or a demonstration of necessity, that it is appropriate to establish a schedule of interim requirements regarding the implementation of a CTR criterion. Such interim schedules may be established based on a consideration of time needed to collect sufficient data to: (1) determine whether effluent limitations are needed (as described in section 1.3); and (2) calculate effluent limitations (as described in section 1.4), including developing a site-specific translator (as described in section 1.4.1) and conducting a mixing zone study (as described in section 1.4.2).

If a discharger makes a successful demonstration, as determined by the RWQCB, that available data are insufficient, the permit provisions shall specify a schedule <u>not to exceed three years from the effective date of this Policy</u>[11] that contains interim requirements and dates for their achievement. There shall be no more than one year between interim dates. The interim requirements shall state that the discharger must notify the RWQCB, in writing, no later than 14 days following each interim date, of its compliance or noncompliance with the interim requirements (or must submit a progress report, if applicable). Additional requirements that are specific to two situations follow:

A. Insufficient Data to Determine if an Effluent Limitation for a CTR Criterion is Needed

The RWQCB shall <u>not</u> establish in the NPDES permit numeric interim limitations, and source control or *pollutant minimization measures, for the pollutant, but shall instead require the discharger to collect the needed data. These data requirements should be sufficient to contribute to the data needs for both sections 1.3 and 1.4. When the needed data have been provided in accordance with the interim requirements, the RWQCB shall determine, based on the data and the section 1.3 procedure, if water quality-based effluent limitations are necessary for the pollutant. If the RWQCB determines that effluent limitations are needed, the RWQCB shall calculate them, reopen the permit, and include the calculated effluent limitations in the permit provisions.

B. Insufficient Data to Calculate a Final Effluent Limitation for a CTR Criterion

The RWQCB shall establish in the NPDES permit numeric interim limitations, and may also establish other interim requirements such as requiring the discharger to implement *pollutant minimization and/or source control measures and participate in the activities necessary to develop final effluent limitations. Numeric interim limitations for the pollutant must be based on current treatment facility performance or on existing permit limitations, whichever is more

[11] Note that the schedule to submit a translator for approval by the RWQCB is up to two years from the date of issuance/reissuance of the permit (as described in section 1.4.1).

stringent. If the existing permit limitations are more stringent, and the discharger is not in compliance with those limitations, the noncompliance under the existing permit must be addressed through appropriate enforcement action before the permit can be reissued, unless antibacksliding provisions are met.

Permit findings shall also state the appropriate enforcement actions that may be taken by the RWQCB if interim limitations and requirements are not met. Except as provided in section 1.4.1 (for a translator study), the permit provisions shall not include a final effluent limitation, but the permit findings shall include: (1) the water quality to be achieved; (2) the reason that a final water quality-based effluent limitation is not being incorporated into the permit as an enforceable limitation at this time; (3) a statement that it is the intent of the RWQCB to include the final water quality-based effluent limitation as an enforceable limitation in a subsequent permit revision, and that the final water quality-based effluent limitation will be based either on the water quality criterion or on future regulatory developments; and (4) a schedule for development of a final water quality-based effluent limitation. When interim requirements have been completed, the RWQCB shall calculate final water quality-based effluent limitations for that pollutant based on the collected data, reopen the permit, and include the final effluent limitations in the permit provisions. Once final limitations become effective, the interim limitations will no longer apply.

2.3 Monitoring Requirements

The RWQCB shall require dischargers to conduct self-monitoring programs and shall clearly state in all permits the objective and purpose of the monitoring. Furthermore, the RWQCB shall determine, and specify under the monitoring and reporting requirements, the sampling parameters, monitoring frequencies, locations, and analytical methods to be used. To evaluate compliance with effluent limitations, effluent and ambient monitoring should occur within a brief enough period to be able to evaluate the effect of the effluent on the ambient water quality. All data shall be reported in accordance with section 2.4. Options for analytical methods are:

(1) those methods listed in Appendix 4 and described in Tables 1A, 1B, 1C, 1D, and 1E of 40 CFR 136.3 (revised as of May 14, 1999); or alternate test procedures for individual discharges that have been approved by the U.S. EPA Regional Administrator pursuant to 40 CFR 136.4 (a) through (c), inclusive, and 40 CFR 136.5 (a) through (d), inclusive (revised as of May 14, 1999); or

(2) where no methods are specified for a given pollutant in the tables described in (1) above, methods approved by the SWRCB or RWQCB.

Laboratories analyzing monitoring samples shall be certified by the Department of Health Services, in accordance with the provision of Water Code Section 13176, and must include quality assurance/quality control data with their reports.

Dischargers are also encouraged to submit monitoring data in electronic formats approved by the SWRCB or RWQCB.

Furthermore, it is the policy of the SWRCB that individual permit monitoring complement and be

coordinated with water body, watershed, and regional monitoring programs to the extent practicable.

2.4 Reporting Requirements

The discharger shall submit to the RWQCB reports necessary to determine compliance with effluent limitations for priority pollutants in permits. The reports shall comply with the requirements of sections 2.4.1 through 2.4.4.

2.4.1 Reporting Levels

The RWQCB shall require in the permit that the discharger shall report with each sample result:

1. The applicable *Minimum Level (ML) (selected from Appendix 4 in accordance with section 2.4.2 or established in accordance with section 2.4.3); this ML is the "reported ML"; and

2. The laboratory's current *Method Detection Limit (MDL), as determined by the procedure found in 40 CFR 136 (revised as of May 14, 1999).

2.4.2 Selection and Use of Appropriate ML Value

ML Selection: When there is more than one ML value for a given substance, the RWQCB shall cite for inclusion in the permit all ML values, and their associated analytical methods, listed in Appendix 4 that are below the calculated effluent limitation. The discharger may select any one of those cited analytical methods for compliance determination. If no ML value is below the effluent limitation, then the RWQCB shall select the lowest ML value, and its associated analytical method, listed in Appendix 4 for inclusion in the permit.

ML Usage: The ML value in Appendix 4 represents the lowest quantifiable concentration in a sample based on the proper application of all method-based analytical procedures and the absence of any matrix interferences. Assuming that all method-specific analytical steps are followed, the ML value will also represent, after the appropriate application of method-specific factors, the lowest standard in the calibration curve for that specific analytical technique. Common analytical practices sometimes require different treatment of the sample relative to calibration standards. Some examples are given below:

Substance or Grouping	Method-Specified Treatment	Most Common Method-Specific Factor(s)
Volatile organic	No differential treatment	1
Semi-Volatile organic	Samples concentrated by extraction	1000
Metals	Samples diluted or concentrated	½, 2, and 4
Pesticides	Samples concentrated by extraction	100

Other factors may be applied to the ML depending on the specific sample preparation steps employed. For example, the treatment typically applied in cases where there are matrix-effects is to dilute the sample or sample aliquot by a factor of ten. In such cases, this additional factor must be applied in the computation of the reporting limit. Application of such factors will alter the

reported ML (as described in section 2.4.1).

Dischargers are to instruct laboratories to establish calibration standards so that the ML value (or its equivalent if there is differential treatment of samples relative to calibration standards) is the lowest calibration standard. At no time is the discharger to use analytical data derived from *extrapolation* beyond the lowest point of the calibration curve. The discharger's laboratory(ies) may, as allowed for by the rules governing alterations to ML values in section 2.4.3 below, employ a calibration standard lower than the ML value in Appendix 4.

2.4.3 Deviation from MLs Listed in Appendix 4

The RWQCB, in consultation with the SWRCB's Quality Assurance Program, shall establish an ML that is not contained in Appendix 4 to be included in the discharger's permit in any of the following situations:

1. When the pollutant under consideration is not included in Appendix 4.

2. When the discharger and the RWQCB agree to include in the permit a test method that is more sensitive than those specified in 40 CFR 136 (revised as of May 14, 1999).

3. When a discharger agrees to use an ML that is lower than those listed in Appendix 4.

4. When a discharger demonstrates that the calibration standard matrix is sufficiently different from that used to establish the ML in Appendix 4 and proposes an appropriate ML for their matrix.

5. When the discharger uses a method whose quantification practices are not consistent with the definition of an ML. Examples of such methods are the U.S. EPA-approved method 1613 for dioxins and furans, method 1624 for volatile organic substances, and method 1625 for semi-volatile organic substances. In such cases, the discharger, the RWQCB, and the SWRCB shall agree on a lowest quantifiable limit and that limit will substitute for the ML for reporting and compliance determination purposes.

2.4.4 Reporting Protocols

The discharger shall report the results of analytical determinations for the presence of chemical constituents in a sample using the following reporting protocols:

1. Sample results greater than or equal to the reported ML shall be reported as measured by the laboratory (i.e., the measured chemical concentration in the sample).

2. Sample results less than the reported ML, but greater than or equal to the laboratory's MDL, shall be reported as "Detected, but Not Quantified," or DNQ. The *estimated chemical concentration of the sample shall also be reported.

For the purposes of data collection, the laboratory shall write the estimated chemical concentration next to DNQ as well as the words "Estimated Concentration" (may be shortened to "Est. Conc."). The laboratory may, if such information is available, include numerical estimates of the data quality for the reported result. Numerical estimates of data quality may be percent accuracy (± a percentage of the reported value), numerical ranges (low to high), or any other means considered appropriate by the laboratory.

3. Sample results less than the laboratory's MDL shall be reported as "Not Detected," or ND.

2.4.5 Compliance Determination

Compliance with effluent limitations shall be determined as follows:

1. Dischargers shall be deemed out of compliance with an effluent limitation if the concentration of the priority pollutant in the monitoring sample is greater than the effluent limitation and greater than or equal to the reported ML.

2. Dischargers shall be required to conduct a Pollutant Minimization Program (PMP) in accordance with section 2.4.5.1 when there is evidence (e.g., sample results reported as DNQ when the effluent limitation is less than the MDL, sample results from analytical methods more sensitive than those methods included in the permit in accordance with sections 2.4.2 or 2.4.3 above, presence of whole effluent toxicity, health advisories for fish consumption, results of benthic or aquatic organism tissue sampling) that the priority pollutant is present in the effluent above an effluent limitation and either:

   a. A sample result is reported as DNQ and the effluent limitation is less than the reported ML; or

   b. A sample result is reported as ND and the effluent limitation is less than the MDL.

   RWQCBs may include special provisions in the permit to require the gathering of evidence to determine whether the constituent of concern is present in the effluent at levels above a calculated effluent limitation.

When determining compliance with an AMEL and more than one sample result is available in a month, the discharger shall compute the arithmetic mean unless the data set contains one or more reported determinations of DNQ or ND. In those cases, the discharger shall compute the median in place of the arithmetic mean in accordance with the following procedure:

1. The data set shall be ranked from low to high, reported ND determinations lowest, DNQ determinations next, followed by quantified values (if any). The order of the individual ND or DNQ determinations is unimportant.

2. The median value of the data set shall be determined. If the data set has an odd number of data points, then the median is the middle value. If the data set has an even number of data points, then the median is the average of the two values around the middle unless one or both

of the points are ND or DNQ, in which case the median value shall be the lower of the two data points where DNQ is lower than a value and ND is lower than DNQ.

If a sample result, or the arithmetic mean or median of multiple sample results, is below the reported ML, and there is evidence that the priority pollutant is present in the effluent above an effluent limitation and the discharger conducts a PMP (as described in section 2.4.5.1), the discharger shall not be deemed out of compliance.

2.4.5.1 Pollutant Minimization Program

The goal of the PMP shall be to reduce all potential sources of a priority pollutant(s) through *pollutant minimization (control) strategies, including *pollution prevention measures as appropriate[12], to maintain the effluent concentration at or below the water quality-based effluent limitation. The RWQCB may consider cost-effectiveness when establishing the requirements of a PMP. The program shall include, but not be limited to, the following actions and submittals acceptable to the RWQCB:

1. An annual review and semi-annual monitoring of potential sources of the reportable priority pollutant(s), which may include fish tissue monitoring and other bio-uptake sampling;

2. Quarterly monitoring for the reportable priority pollutant(s) in the influent to the wastewater treatment system;

3. Submittal of a control strategy designed to proceed toward the goal of maintaining concentrations of the reportable priority pollutant(s) in the effluent at or below the effluent limitation;

4. Implementation of appropriate cost-effective control measures for the reportable priority pollutant(s), consistent with the control strategy; and

5. An annual status report that shall be sent to the RWQCB including:

    a. All PMP monitoring results for the previous year;

    b. A list of potential sources of the reportable priority pollutant(s);

    c. A summary of all actions undertaken pursuant to the control strategy; and

    d. A description of actions to be taken in the following year.

The permit shall contain a reopener clause authorizing modifications, or revocation and reissuance of the permit, as a result of the detection of a reportable priority pollutant generated by special conditions included in the permit. These special conditions in the permit may be, but are

[12] Pollution prevention measures may be particularly appropriate for persistent bioaccumulative priority pollutants where there is evidence that beneficial uses are being impacted.

not limited to, fish tissue sampling, whole effluent toxicity tests, monitoring requirements on internal waste stream(s), and monitoring for surrogate parameters. Additional requirements may be included in the permit as a result of the special condition monitoring data.

The completion and implementation of a pollution prevention plan, required pursuant to Water Code Section 13263.3(d), shall be considered to fulfill the PMP requirements of this section.

3. 2,3,7,8-TCDD EQUIVALENTS

The CTR includes criteria for 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD). In addition to this compound, there are many congeners of chlorinated dibenzodioxins (2,3,7,8-CDDs) and chlorinated dibenzofurans (2,3,7,8-CDFs) that exhibit toxic effects similar to those of 2,3,7,8-TCDD. The U.S. EPA has published toxic equivalency factors (TEFs) for 17 of the congeners. The TEFs express the relative toxicities of the congeners compared to 2,3,7,8-TCDD (whose TEF equals 1.0). In June 1997, participants in a World Health Organization (WHO) expert meeting revised TEF values for 1,2,3,7,8-PentaCDD, OctaCDD, and OctaCDF. The current TEFs for the 17 congeners, which include the three revised values, are shown in Table 4:

Table 4. Toxic Equivalency Factors (TEFs) for 2,3,7,8-TCDD Equivalents

Congener	TEF
2,3,7,8-TetraCDD	1
1,2,3,7,8-PentaCDD	1.0
1,2,3,4,7,8-HexaCDD	0.1
1,2,3,6,7,8-HexaCDD	0.1
1,2,3,7,8,9-HexaCDD	0.1
1,2,3,4,6,7,8-HeptaCDD	0.01
OctaCDD	0.0001
2,3,7,8-TetraCDF	0.1
1,2,3,7,8-PentaCDF	0.05
2,3,4,7,8-PentaCDF	0.5
1,2,3,4,7,8-HexaCDF	0.1
1,2,3,6,7,8-HexaCDF	0.1
1,2,3,7,8,9-HexaCDF	0.1
2,3,4,6,7,8-HexaCDF	0.1
1,2,3,4,6,7,8-HeptaCDF	0.01
1,2,3,4,7,8,9-HeptaCDF	0.01
OctaCDF	0.0001

TEF Reference: Van den Berg, M., et al. (22 additional authors). 1998. Toxic Equivalency Factors (TEFs) for PCBs, PCDDs, PCDFs, for humans and wildlife. Environmental Health Perspectives 106(12):775-792.

Whether or not an effluent limitation is required for 2,3,7,8-TCDD in accordance with section 1.3 of this Policy, each RWQCB shall require (as described below) major and minor POTW and industrial dischargers in its region to conduct effluent monitoring for the 2,3,7,8-TCDD congeners listed above. The purpose of the monitoring is to assess the presence and amounts of the congeners being discharged to inland surface waters, enclosed bays, and estuaries for the development of a strategy to control these chemicals in a future multi-media approach.

Within one year of the effective date of this Policy, each RWQCB shall either (1) amend the NPDES permits, or (2) send a written request for the information pursuant to California Water Code Section 13267 or 13383, for NPDES permittees in their respective regions, requiring, for a period of three consecutive years from the date the permit is amended or the request is sent, that: (1) each major POTW and major industrial discharger monitor its effluent for the presence of the 17 congeners once during dry weather and once during wet weather each of the three years; and (2) each minor POTW and minor industrial discharger monitor its effluent for the presence of the 17 congeners once during dry weather and once during wet weather for one year during the three-year period.

The RWQCB should coordinate this region-wide monitoring to provide data that are consistent with the purpose of the provisions of this section to the extent possible. The RWQCB shall encourage public and private dischargers, and local governments, to develop a coordinated, cooperative regional monitoring program to gather this information.

The RWQCB shall require the discharger to report for each congener the analytical results of the effluent monitoring, including the quantifiable limit[13] and the MDL, and the measured or estimated concentration. In addition, the RWQCB shall require the discharger to multiply each measured or estimated congener concentration by its respective TEF value (presented above) and report the sum of these values. This information shall be submitted to the RWQCB as part of the discharger's self-monitoring reports, in accordance with section 2.3. The RWQCB shall, subsequently, submit the information to the SWRCB.

Based on the monitoring results, the RWQCB may, at its discretion, increase the monitoring requirement (e.g., increase sampling frequency) to further investigate frequent or significant detections of any congener. At the conclusion of the three-year monitoring period, the SWRCB and RWQCBs will assess the data (a total of six samples each from major POTWs and industrial dischargers, and a total of two samples each from minor POTWs and industrial dischargers), and determine whether further monitoring is necessary.

4. TOXICITY CONTROL PROVISIONS

This section establishes minimum toxicity control requirements for implementing the narrative toxicity objectives for aquatic life protection in RWQCB basin plans. These provisions are intended to supplement basin plan requirements and do not supersede existing RWQCB toxicity requirements.

[13] As determined by the procedure found in section 2.4.3, number 5.

Water Quality-Based Toxicity Control

A chronic toxicity effluent limitation is required in permits for all discharges that will cause, have reasonable potential to cause, or contribute to chronic toxicity in receiving waters.

To determine compliance with the chronic aquatic life toxicity objective in a RWQCB basin plan, or an effluent limitation based on the objective, the RWQCB shall require, in a permit or other appropriate order, the use of short-term chronic toxicity tests. At least three test species with approved test protocols shall be used to measure compliance with the toxicity objective. If possible, the test species shall include a vertebrate, an invertebrate, and an aquatic plant. After a screening period, monitoring may be reduced to the most sensitive species. Dilution and control waters should be obtained from an area unaffected by the discharge in the receiving waters. For rivers and streams, dilution water should be obtained immediately upstream of the wastewater outfall. Standard dilution water can be used if the above sources exhibit toxicity or if approved by the RWQCB. The sensitivity of the test organisms to a reference toxicant shall be determined concurrently with each bioassay and reported with the test results.

The tests contained in Appendix II, "Chapter IV. Compliance With Toxicity Limitations and Objectives", of the California Ocean Plan (amended March 20, 1997 and effective July 23, 1997) are incorporated by reference and one or more of these tests shall be used to measure toxicity in salt water. This incorporation-by-reference is prospective, including future changes to the incorporated provisions as the changes take effect. One or more of the tests in Table 5 shall be used to measure chronic toxicity in fresh water.

Table 5. Short-term Methods for Estimating Chronic Toxicity--Fresh Water

Species	Effect	Test duration (days)
fathead minnow (*Pimephales promelas*)	larval survival; growth	7
water flea (*Ceriodaphnia dubia*)	survival; number of young	6 to 8
alga (*Selenastrum capricornutum*)	growth rate	4

Toxicity Test Reference: U.S. EPA. 1994. Short-term methods for estimating the chronic toxicity of effluents and receiving waters to freshwater organisms. Third edition. U.S. EPA Environmental Monitoring Systems Laboratory, Cincinnati, Ohio. EPA/600/4-91-002.

Toxicity Reduction Requirements

If a discharge causes or contributes to chronic toxicity in a receiving water body, a *toxicity reduction evaluation (TRE) is required. Where multiple dischargers to the same water body are required to conduct TREs, the TREs may be coordinated with the approval of the RWQCB. The TRE shall include all reasonable steps to identify the source(s) of toxicity. Once the source of toxicity is identified, the discharger shall take all reasonable steps necessary to eliminate toxicity.

The following shall be incorporated into permits: (1) a requirement to conduct a TRE if repeated tests reveal toxicity as a result of the waste discharge; (2) a provision requiring a discharger to take all reasonable steps to control toxicity once the source of toxicity is identified; and (3) a statement that failure to conduct required toxicity tests or a TRE within a designated period shall result in the establishment of effluent limitations for chronic toxicity in a permit or appropriate enforcement action.

5. SPECIAL PROVISIONS

The following sections include provisions that address certain discharges and factors that could affect the application of other provisions in this Policy. They include: (1) nonpoint source discharges (section 5.1); (2) site-specific objectives (section 5.2); and (3) exceptions to the Policy provisions (section 5.3).

5.1 Nonpoint Source Discharges

It is the intent of the SWRCB, in adopting this Policy, that the implementation of the priority pollutant criteria/objectives and other requirements of this Policy for nonpoint source discharges shall be consistent with the State's "three-tiered approach" for nonpoint sources. The three tiers, listed in order of increasing stringency, are:

Tier 1. Self-determined implementation of management practices (such as BMPs).

Tier 2. Regulatory-based encouragement of BMPs (through, e.g., WDR waivers conditioned on BMP implementation or management agency agreements between the SWRCB and/or RWQCBs and other agencies with authority to enforce BMPs).

Tier 3. Effluent limitations and enforcement (through, e.g., WDRs, time schedule orders, cease and desist orders, and cleanup and abatement orders).

The RWQCBs may select the appropriate tier, or combination of tiers, to address nonpoint source discharges of priority pollutants. The SWRCB, in adopting this Policy, understands that nonpoint source pollution control can best be achieved through the cooperative efforts of the dischargers, other interested persons, and the SWRCB and RWQCBs.

5.2 Site-Specific Objectives

If a priority pollutant criterion or objective is inappropriate for a particular water body (i.e., it does not protect the beneficial uses or, based on site-specific conditions, a less stringent standard may be warranted), a water quality objective that differs from the applicable criterion or objective may be developed for the site. A RWQCB may develop site-specific objectives whenever it determines, in the exercise of its professional judgement, that it is appropriate to do so. Where a priority pollutant criterion or objective is not being attained in the water body, under certain circumstances, it may be more appropriate to pursue other approaches to achieve the applicable criterion or objective rather than develop a site-specific objective. These approaches include, but

are not limited to, watershed management and development of TMDLs (see Appendix 5 and Appendix 6). The RWQCB may investigate, facilitate, or implement such approaches as appropriate.

Regardless of an action taken by the RWQCB as described above, the RWQCB shall, at a public meeting, consider initiating the development of a site-specific objective under the following conditions:

(1) A written request for a site-specific study, accompanied by a preliminary commitment to fund the study, subject to development of a workplan[14], is filed with the RWQCB; and

(2) Either:

  (a) a priority pollutant criterion or objective is not achieved in the receiving water; or
  (b) a holder of an NPDES permit demonstrates that they do not, or may not in the future, meet an existing or potential effluent limitation based on the priority pollutant criterion or objective; and

(3) A demonstration that the discharger cannot be assured of achieving the criterion or objective and/or effluent limitation through reasonable treatment, source control, and *pollution prevention measures. This demonstration may include, but is not limited to, as determined by the RWQCB:

  (a) an analysis of compliance and consistency with all relevant federal and State plans, policies, laws, and regulations;
  (b) a thorough review of historical limits and compliance with those limits;
  (c) a thorough review of current technology and technology-based limits; and
  (d) an economic analysis of compliance with the priority pollutant criterion or objective of concern.

During the period when site-specific objectives studies are being conducted, the RWQCB shall place effluent limitations based upon the applicable priority pollutant criteria or objectives into permits only in conjunction with an appropriate compliance schedule and interim requirements, as described in sections 2.1 and 2.2.

A discharger subject to a schedule for compliance with a CTR criterion or CTR criterion-based effluent limitations, as described in section 2.1, may choose to, concurrently with the actions necessary to achieve compliance, conduct the studies necessary to support the development and adoption of a site-specific objective.[15]

Following adoption of a site-specific objective by the RWQCB, existing effluent limitations shall be replaced with effluent limitations (calculated as described in section 1.4) based on the adopted site-specific objective if the analysis in section 1.3 indicates that a limitation for the pollutant is

---

[14] The elements presented under the "Special Studies Process" in Appendix 5 should be considered in developing the site-specific objectives workplan.

[15] A RWQCB may include a compliance schedule in a water quality standard based on a site-specific objective. Such a compliance schedule is separate and distinct from the compliance schedules established by this Policy.

required. In the event that, for reasons beyond the control of the discharger, a decision whether or not to adopt site-specific objectives has not been made by the RWQCB before the end of the compliance schedule, the compliance schedule shall be extended for an additional period to allow time for a decision whether or not to adopt the objective. However, in no event may a compliance schedule exceed the maximum time period allowed for compliance with the CTR criteria (as described in section 2.1) or priority pollutant objectives (as described in the basin plan, if applicable), unless an exception has been granted (in accordance with section 5.3).

Development of Site-Specific Objectives

Water quality objectives shall be developed in a manner consistent with State and federal law and regulations. In accordance with the State's Porter-Cologne Water Quality Control Act (Division 7 of the Water Code), objectives must provide for the reasonable protection of beneficial uses based on consideration of the factors listed in Water Code Section 13241. In accordance with federal law (CWA) and regulations (40 CFR 131.11, revised as of July 1, 1997), the objectives must be based on sound scientific rationale and protect the designated beneficial uses of the receiving water.

The RWQCB shall use scientifically defensible methods appropriate to the situation to derive the objectives. Such methods may include U.S. EPA-approved methods (e.g., Water Effects Ratio [WER] procedure, recalculation procedure, a combination of recalculation and WER procedures, Resident Species Procedure), and/or other methods specified in the workplan.

A site-specific objective adopted by the RWQCB may include a compliance schedule. However, if attainment of the potential objective(s) developed under the study is anticipated to be infeasible (as defined in 40 CFR 131.10(g), revised as of July 1, 1997), or if the RWQCB otherwise determines it is appropriate, a *use attainability analysis (UAA) may be conducted. The RWQCB shall conduct, with the participation of interested persons, as appropriate, the UAA in accordance with 40 CFR 131.10(j) (revised as of July 1, 1997). If the UAA shows that attainment of the designated beneficial use(s) is not feasible (pursuant to 40 CFR 131.10(g), revised as of July 1, 1997), the RWQCB shall designate an alternative beneficial use or subcategory of use, and develop appropriate water quality objectives to protect the new use(s). Both the use(s) and the objective(s) established to protect it would be reevaluated during the triennial reviews of the State's water quality standards.

5.3 Exceptions

Categorical and case-by-case exceptions to this Policy may be granted pursuant to the provisions below.

Categorical Exceptions

The RWQCB may, after compliance with the California Environmental Quality Act (CEQA), allow short-term or seasonal exceptions from meeting the priority pollutant criteria/objectives if determined to be necessary to implement control measures either:

1.for resource or pest management (i.e., vector or weed control, pest eradication, or fishery management) conducted by *public entities to fulfill statutory requirements, including, but not limited to, those in the California Fish and Game, Food and Agriculture, Health and Safety, and Harbors and Navigation codes; or

2.regard ing drinking water conducted to fulfill statutory requirements under the federal Safe Drinking Water Act or the California Health and Safety Code. Such categorical exceptions may also be granted for draining water supply reservoirs, canals, and pipelines for maintenance, for draining municipal storm water conveyances for cleaning or maintenance, or for draining water treatment facilities for cleaning or maintenance.

For each project, the discharger shall notify potentially affected public and governmental agencies. Also, the discharger shall submit to the Executive Officer of the appropriate RWQCB, for approval:

(1) A detailed description of the proposed action, including the proposed method of completing the action;

(2) A time schedule;

(3) A discharge and receiving water quality monitoring plan (before project initiation, during the project, and after project completion, with the appropriate quality assurance and quality control procedures);

(4) CEQA documentation;

(5) Contingency plans;

(6) Identification of alternate water supply (if needed); and

(7) Residual waste disposal plans.

Additionally, upon completion of the project, the discharger shall provide certification by a qualified biologist that the receiving water beneficial uses have been restored.

To prevent unnecessary delays in taking emergency actions or to expedite the approval process for expected or routine activities that fall under categorical exceptions, the discharger is advised to file with the appropriate RWQCB, in advance of seeking RWQCB approval, the information required in items (1)-(7) above, to the extent possible.

Case-by-Case Exceptions

Where site-specific conditions in individual water bodies or watersheds differ sufficiently from statewide conditions and those differences cannot be addressed through other provisions of this

Policy, the SWRCB may, in compliance with the CEQA, subsequent to a public hearing, and with the concurrence of the U.S. EPA, grant an exception to meeting a priority pollutant criterion/objective or any other provision of this Policy where the SWRCB determines:

1.T he exception will not compromise protection of enclosed bay, estuarine, and inland surface waters for beneficial uses; and

2.T he public interest will be served.

An example of where a case-by-case exception would be appropriate is where it is necessary to accommodate wastewater reclamation or water conservation.

APPENDIX 1

Definition of Terms

ACUTELY TOXIC CONDITIONS, as used in the context of mixing zones, refers to lethality that occurs to mobile aquatic organisms that move or drift through the mixing zone.

ARITHMETIC MEAN (μ), also called the average, is the sum of measured values divided by the number of samples. For ambient water concentrations, the arithmetic mean is calculated as follows:

Arithmetic mean = $\mu = \Sigma x / n$ where:

Σx is the sum of the measured ambient water concentrations, and
n is the number of samples.

AVERAGE MONTHLY EFFLUENT LIMITATION (AMEL) means the highest allowable average of daily pollutant discharges over a calendar month, calculated as the sum of all daily discharges measured during a calendar month divided by the number of measurements.

BEST MANAGEMENT PRACTICES (BMPs) are methods, measures, or practices designed and selected to reduce or eliminate the discharge of pollutants to surface waters from point and nonpoint source discharges including storm water. BMPs include structural and non-structural controls, and operation and maintenance procedures, which can be applied before, during, and/or after pollution producing activities.

BIOACCUMULATIVE pollutants are those substances taken up by an organism from its surrounding medium through gill membranes, epithelial tissue, or from food and subsequently concentrated and retained in the body of the organism.

BIOLOGICALLY-BASED RECEIVING WATER FLOW refers to the method for determining receiving water flows developed by the U.S. EPA Office of Research and Development which directly uses the averaging periods and exceedance frequencies specified in the acute and chronic aquatic life criteria for individual pollutants (e.g., 1 day and 3 years for acute criteria, and 4 days and 3 years for the chronic criteria). Biologically-based flows can be calculated using the program DFLOW.

CARCINOGENIC pollutants are substances that are known to cause cancer in living organisms.

COEFFICIENT OF VARIATION (*CV*) is a measure of the data variability and is calculated as the estimated standard deviation divided by the arithmetic mean of the observed values.

COMPLETELY-MIXED DISCHARGE condition means not more than a 5 percent difference, accounting for analytical variability, in the concentration of a pollutant exists across a transect of the water body at a point within two stream/river widths from the discharge point.

DILUTION CREDIT is the amount of dilution granted to a discharge in the calculation of a water quality-based effluent limitation, based on the allowance of a specified mixing zone. It is calculated from the dilution ratio or determined through conducting a mixing zone study or modelling of the discharge and receiving water.

DILUTION RATIO is the critical low flow of the upstream receiving water divided by the flow of the effluent discharged.

DYNAMIC MODELS used for calculating effluent limitations predict the effects of receiving water and effluent flow and of concentration variability. The outputs of dynamic models can be used to base effluent limitations on probability estimates of receiving water concentrations rather than critical conditions (which are used in the steady-state model). The three dynamic modeling techniques recommended by the U.S. EPA for calculating effluent limitations are continuous simulation, Monte Carlo simulation, and lognormal probability modeling.

EFFLUENT CONCENTRATION ALLOWANCE (ECA) is a value derived from the water quality criterion/objective, dilution credit, and ambient background concentration that is used, in conjunction with the coefficient of variation for the effluent monitoring data, to calculate a long-term average (LTA) discharge concentration. The ECA has the same meaning as waste load allocation (WLA) as used in U.S. EPA guidance (Technical Support Document For Water Quality-based Toxics Control, March 1991, second printing, EPA/505/2-90-001).

ENCLOSED BAYS means indentations along the coast that enclose an area of oceanic water within distinct headlands or harbor works. Enclosed bays include all bays where the narrowest distance between the headlands or outermost harbor works is less than 75 percent of the greatest dimension of the enclosed portion of the bay. Enclosed bays include, but are not limited to, Humboldt Bay, Bodega Harbor, Tomales Bay, Drake's Estero, San Francisco Bay, Morro Bay, Los Angeles-Long Beach Harbor, Upper and Lower Newport Bay, Mission Bay, and San Diego Bay. Enclosed bays do not include inland surface waters or ocean waters.

ESTIMATED CHEMICAL CONCENTRATION is the estimated chemical concentration that results from the confirmed detection of the substance by the analytical method below the ML value.

ESTUARIES means waters, including coastal lagoons, located at the mouths of streams that serve as areas of mixing for fresh and ocean waters. Coastal lagoons and mouths of streams that are temporarily separated from the ocean by sandbars shall be considered estuaries. Estuarine waters shall be considered to extend from a bay or the open ocean to a point upstream where there is no significant mixing of fresh water and sea water. Estuarine waters include, but are not limited to, the Sacramento-San Joaquin Delta, as defined in Water Code Section 12220, Suisun Bay, Carquinez Strait downstream to the Carquinez Bridge, and appropriate areas of the Smith, Mad, Eel, Noyo, Russian, Klamath, San Diego, and Otay rivers. Estuaries do not include inland surface waters or ocean waters.

EXISTING DISCHARGER means any discharger that is not a new discharger. An existing discharger includes an "increasing discharger" (i.e., an existing facility with treatment systems in

place for its current discharge that is or will be expanding, upgrading, or modifying its existing permitted discharge after the effective date of this Policy).

FOUR-DAY AVERAGE OF DAILY MAXIMUM FLOWS is the average of daily maximums taken from the data set in four-day intervals.

HARMONIC MEAN flows are expressed as $Q_{hm} = (n)/(\Sigma^{n}_{i=1} 1/x_i)$, where x_i = specific data values and n = number of data values.

INCOMPLETELY-MIXED DISCHARGE is a discharge that contributes to a condition that does not meet the meaning of a completely-mixed discharge condition.

INFEASIBLE means not capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, legal, social, and technological factors.

INLAND SURFACE WATERS are all surface waters of the State that do not include the ocean, enclosed bays, or estuaries.

LOAD ALLOCATION (LA) is the portion of a receiving water's total maximum daily load that is allocated to one of its nonpoint sources of pollution or to natural background sources.

LONG-TERM ARITHMETIC MEAN FLOW is at least two years of flow data used in calculating an arithmetic mean as defined in this appendix.

MAXIMUM DAILY FLOW is the maximum flow sample of all samples collected in a calendar day.

MAXIMUM DAILY EFFLUENT LIMITATION (MDEL) means the highest allowable daily discharge of a pollutant, over a calendar day (or 24-hour period). For pollutants with limitations expressed in units of mass, the daily discharge is calculated as the total mass of the pollutant discharged over the day. For pollutants with limitations expressed in other units of measurement, the daily discharge is calculated as the arithmetic mean measurement of the pollutant over the day.

MEDIAN is the middle measurement in a set of data. The median of a set of data is found by first arranging the measurements in order of magnitude (either increasing or decreasing order). If the number of measurements (n) is odd, then the median = $X_{(n+1)/2}$. If n is even, then the median = $(X_{n/2} + X_{(n/2)+1})/2$ (i.e., the midpoint between the $n/2$ and $n/2+1$).

METHOD DETECTION LIMIT (MDL) is the minimum concentration of a substance that can be measured and reported with 99 percent confidence that the analyte concentration is greater than zero, as defined in 40 CFR 136, Appendix B, revised as of May 14, 1999.

MINIMUM LEVEL (ML) is the concentration at which the entire analytical system must give a recognizable signal and acceptable calibration point. The ML is the concentration in a sample that is equivalent to the concentration of the lowest calibration standard analyzed by a specific

analytical procedure, assuming that all the method specified sample weights, volumes, and processing steps have been followed.

MIXING ZONE is a limited volume of receiving water that is allocated for mixing with a wastewater discharge where water quality criteria can be exceeded without causing adverse effects to the overall water body.

MUTAGENIC pollutants are substances that are known to cause a mutation (i.e., change in a gene or chromosome) in living organisms.

NEW DISCHARGER includes any building, structure, facility, or installation from which there is, or may be, a discharge of pollutants, the construction of which commenced after the effective date of this Policy.

OBJECTIONABLE BOTTOM DEPOSITS are an accumulation of materials or substances on or near the bottom of a water body which creates conditions that adversely impact aquatic life, human health, beneficial uses, or aesthetics. These conditions include, but are not limited to, the accumulation of pollutants in the sediments and other conditions that result in harm to benthic organisms, production of food chain organisms, or fish egg development. The presence of such deposits shall be determined by RWQCB(s) on a case-by-case basis.

OCEAN WATERS are the territorial marine waters of the State as defined by California law to the extent these waters are outside of enclosed bays, estuaries, and coastal lagoons. Discharges to ocean waters are regulated in accordance with the SWRCB's California Ocean Plan.

PERSISTENT pollutants are substances for which degradation or decomposition in the environment is nonexistent or very slow.

POLLUTANT MINIMIZATION means waste minimization and pollution prevention actions that include, but are not limited to, product substitution, waste stream recycling, alternative waste management methods, and education of the public and businesses.

POLLUTION PREVENTION means any action that causes a net reduction in the use or generation of a hazardous substance or other pollutant that is discharged into water and includes, but is not limited to, input change, operational improvement, production process change, and product reformulation (as defined in Water Code Section 13263.3). Pollution prevention does not include actions that merely shift a pollutant in wastewater from one environmental medium to another environmental medium, unless clear environmental benefits of such an approach are identified to the satisfaction of the SWRCB or RWQCB.

PROCESS OPTIMIZATION means minor changes to the existing facility and treatment plant operations that optimize the effectiveness of the existing treatment processes.

PUBLIC ENTITY includes the federal government or a state, county, city and county, city, district, public authority, or public agency.

SOURCE OF DRINKING WATER is any water designated as municipal or domestic supply (MUN) in a RWQCB basin plan.

STANDARD DEVIATION (σ) is a measure of variability that is calculated as follows:

$$\sigma = (\Sigma[(x - \mu)^2]/(n - 1))^{0.5}$$

where:

x is the observed value;

μ is the arithmetic mean of the observed values; and

n is the number of samples.

TERATOGENIC pollutants are substances that are known to cause structural abnormalities or birth defects in living organisms.

TOXICITY REDUCTION EVALUATION (TRE) is a study conducted in a step-wise process designed to identify the causative agents of effluent or ambient toxicity, isolate the sources of toxicity, evaluate the effectiveness of toxicity control options, and then confirm the reduction in toxicity. The first steps of the TRE consist of the collection of data relevant to the toxicity, including additional toxicity testing, and an evaluation of facility operations and maintenance practices, and best management practices. A Toxicity Identification Evaluation (TIE) may be required as part of the TRE, if appropriate. (A TIE is a set of procedures to identify the specific chemical(s) responsible for toxicity. These procedures are performed in three phases [characterization, identification, and confirmation] using aquatic organism toxicity tests.)

USE ATTAINABILITY ANALYSIS is a structured scientific assessment of the factors affecting the attainment of the use which may include physical, chemical, biological, and economic factors as described in 40 CFR 131.10(g) (40 CFR 131.3, revised as of July 1, 1997).

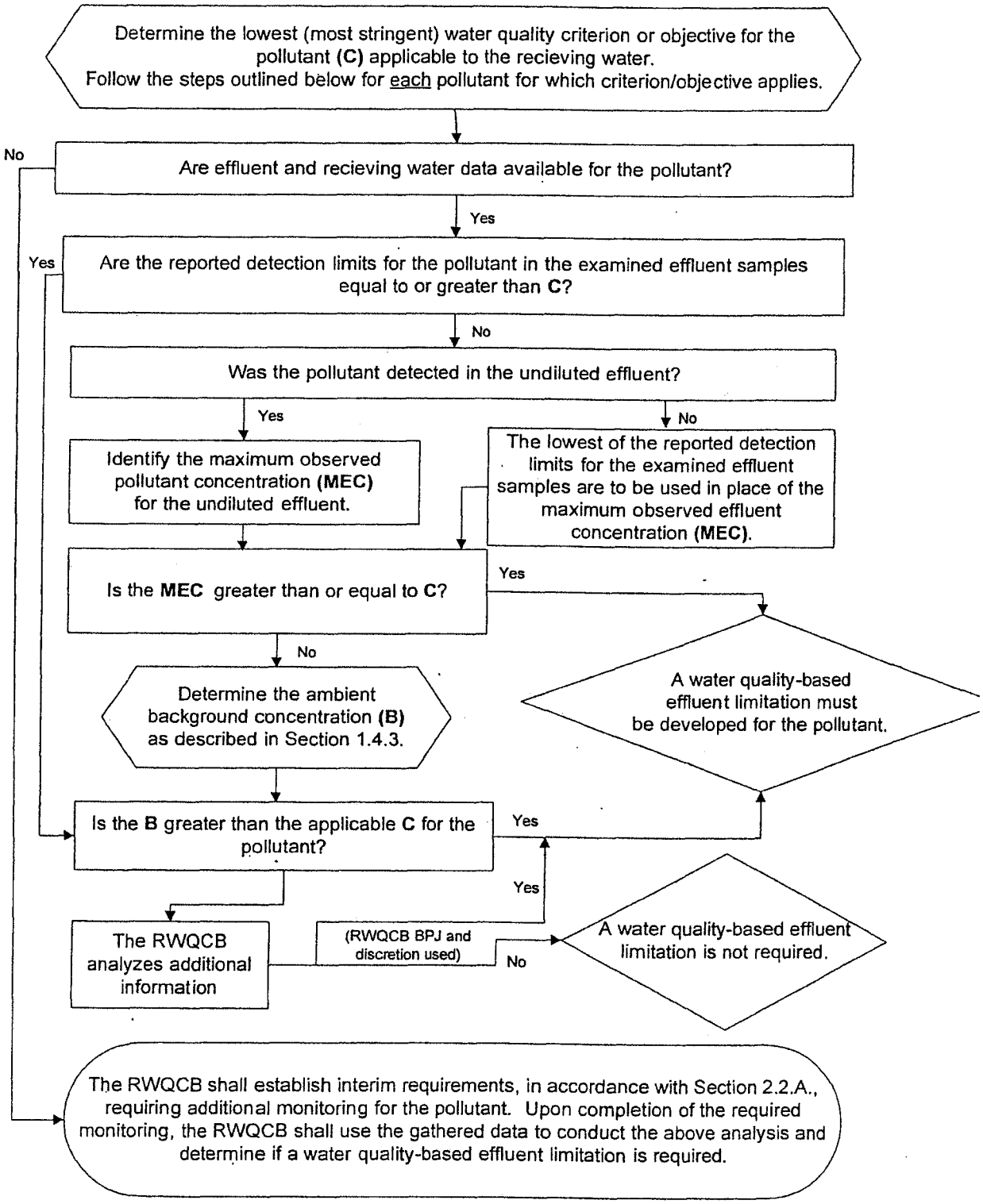
1Q10 is the lowest flow that occurs for one day with a statistical frequency of once every 10 years.

7Q10 is the average low flow that occurs for seven consecutive days with a statistical frequency of once every 10 years.

90th PERCENTILE OF OBSERVED DATA is the measurement in the ordered set of data (lowest to highest) where 90 percent of the reported measurements are less than or equal to that value.

APPENDIX 2

Determination of Pollutants Requiring Water Quality-Based Effluent Limitations



APPENDIX 3

U.S. Environmental Protection Agency Conversion Factors

Metal	Conversion Factor (CF) for Freshwater Acute Criteria	CF for Freshwater Chronic Criteria	CF for Saltwater Acute Criteria	CF(a) for Saltwater Chronic Criteria
Antimony	(d)	(d)	(d)	(d)
Arsenic	1.000	1.000	1.000	1.000
Beryllium	(d)	(d)	(d)	(d)
Cadmium (b)	0.944	0.909	0.994	0.994
Chromium (III)	0.316	0.860	(d)	(d)
Chromium (VI)	0.982	0.962	0.993	0.993
Copper	0.960	0.960	0.83	0.83
Lead (b)	0.791	0.791	0.951	0.951
Mercury	0.85	0.85	0.85	0.85
Nickel	0.998	0.997	0.990	0.990
Selenium	(c)	(c)	0.998	0.998
Silver	0.85	(d)	0.85	(d)
Thallium	(d)	(d)	(d)	(d)
Zinc	0.978	0.986	0.946	0.946

Footnotes:

(a) Conversion Factors for chronic marine criteria are not currently available. Conversion Factors for acute marine criteria have been used for both acute and chronic marine criteria.

(b) Conversion Factors for these pollutants are hardness dependent. CFs are based on a hardness of 100 mg/L as calcium carbonate ($CaCO_3$). Other hardness can be used; CFs should be recalculated using the following equations:
Cadmium: Acute: CF = 1.136672 - [(ln {hardness})(0.041838)]
Cadmium: Chronic: CF = 1.101672 - [(ln {hardness})(0.041838)]
Lead: Acute and Chronic: CF = 1.46203 - [ln {hardness})(0.145712)]

(c) Bioaccumulative compound and inappropriate to adjust to percent dissolved.

(d) U.S. EPA has not published an aquatic life criterion value.

NOTE: The term "Conversion Factor" represents the recommended conversion factor for converting a metal criterion expressed as the total recoverable fraction in the water column to a criterion expressed as the dissolved fraction in the water column. See "Office of Water Policy and Technical Guidance on Interpretation and Implementation of Aquatic Life Metals Criteria," October 1, 1993, by Martha G. Prothro, Acting Assistant Administrator for Water, available from the Water Resource Center, USEPA, 401 M St. SW., mail code RC 4100, Washington, DC 20460; and 40 CFR §131.36(b)(1).

Source: CTR (65 Fed. Register 31682-31719, May 18, 2000), adding Section 131.38 to 40 CFR).

APPENDIX 4

SWRCB Minimum Levels in ppb (μg/L)

The Minimum Levels (MLs) in this appendix are for use in reporting and compliance determination purposes in accordance with section 2.4 of this Policy. These MLs were derived from data for priority pollutants provided by State certified analytical laboratories in 1997 and 1998. These MLs shall be used until new values are adopted by the SWRCB and become effective. The following tables (Tables 2a - 2d) present MLs for four major chemical groupings: volatile substances, semi-volatile substances, inorganics, and pesticides & PCBs.

Table 2a - VOLATILE SUBSTANCES*	GC	GCMS
1,1 Dichloroethane	0.5	1
1,1 Dichloroethene	0.5	2
1,1,1 Trichloroethane	0.5	2
1,1,2 Trichloroethane	0.5	2
1,1,2,2 Tetrachloroethane	0.5	1
1,2 Dichlorobenzene (volatile)	0.5	2
1,2 Dichloroethane	0.5	2
1,2 Dichloropropane	0.5	1
1,3 Dichlorobenzene (volatile)	0.5	2
1,3 Dichloropropene (volatile)	0.5	2
1,4 Dichlorobenzene (volatile)	0.5	2
Acrolein	2.0	5
Acrylonitrile	2.0	2
Benzene	0.5	2
Bromoform	0.5	2
Bromomethane	1.0	2
Carbon Tetrachloride	0.5	2
Chlorobenzene	0.5	2
Chlorodibromo-methane	0.5	2
Chloroethane	0.5	2
Chloroform	0.5	2
Chloromethane	0.5	2
Dichlorobromo-methane	0.5	2
Dichloromethane	0.5	2
Ethylbenzene	0.5	2
Tetrachloroethene	0.5	2
Toluene	0.5	2
trans-1,2 Dichloroethylene	0.5	1
Trichloroethene	0.5	2
Vinyl Chloride	0.5	2

*The normal method-specific factor for these substances is 1, therefore, the lowest standard concentration in the calibration curve is equal to the above ML value for each substance.

Table 2b - SEMI-VOLATILE SUBSTANCES*	GC	GCMS	LC	COLOR
1,2 Benzanthracene	10	5		
1,2 Dichlorobenzene (semivolatile)	2	2		
1,2 Diphenylhydrazine		1		
1,2,4 Trichlorobenzene	1	5		
1,3 Dichlorobenzene (semivolatile)	2	1		
1,4 Dichlorobenzene (semivolatile)	2	1		
2 Chlorophenol	2	5		
2,4 Dichlorophenol	1	5		
2,4 Dimethylphenol	1	2		
2,4 Dinitrophenol	5	5		
2,4 Dinitrotoluene	10	5		
2,4,6 Trichlorophenol	10	10		
2,6 Dinitrotoluene		5		
2- Nitrophenol		10		
2-Chloroethyl vinyl ether	1	1		
2-Chloronaphthalene		10		
3,3' Dichlorobenzidine		5		
3,4 Benzofluoranthene		10	10	
4 Chloro-3-methylphenol	5	1		
4,6 Dinitro-2-methylphenol	10	5		
4- Nitrophenol	5	10		
4-Bromophenyl phenyl ether	10	5		
4-Chlorophenyl phenyl ether		5		
Acenaphthene	1	1	0.5	
Acenaphthylene		10	0.2	
Anthracene		10	2	
Benzidine		5		
Benzo(a) pyrene(3,4 Benzopyrene)		10	2	
Benzo(g,h,i)perylene		5	0.1	
Benzo(k)fluoranthene		10	2	
bis 2-(1-Chloroethoxyl) methane		5		
bis(2-chloroethyl) ether	10	1		
bis(2-Chloroisopropyl) ether	10	2		
bis(2-Ethylhexyl) phthalate	10	5		
Butyl benzyl phthalate	10	10		
Chrysene		10	5	
di-n-Butyl phthalate		10		
di-n-Octyl phthalate		10		
Dibenzo(a,h)-anthracene		10	0.1	
Diethyl phthalate	10	2		
Dimethyl phthalate	10	2		
Fluoranthene	10	1	0.05	
Fluorene		10	0.1	
Hexachloro-cyclopentadiene	5	5		

Table 2b - SEMI-VOLATILE SUBSTANCES*	GC	GCMS	LC	COLOR
Hexachlorobenzene	5	1		
Hexachlorobutadiene	5	1		
Hexachloroethane	5	1		
Indeno(1,2,3,cd)-pyrene		10	0.05	
Isophorone	10	1		
N-Nitroso diphenyl amine	10	1		
N-Nitroso-dimethyl amine	10	5		
N-Nitroso -di n-propyl amine	10	5		
Naphthalene	10	1	0.2	
Nitrobenzene	10	1		
Pentachlorophenol	1	5		
Phenanthrene		5	0.05	
Phenol **	1	1		50
Pyrene		10	0.05	

* With the exception of phenol by colorimetric technique, the normal method-specific factor for these substances is 1000, therefore, the lowest standard concentration in the calibration curve is equal to the above ML value for each substance multiplied by 1000.

** Phenol by colorimetric technique has a factor of 1.

Table 2c – INORGANICS*	FAA	GFAA	ICP	ICPMS	SPGFAA	HYDRIDE	CVAA	COLOR	DCP
Antimony	10	5	50	0.5	5	0.5			1000
Arsenic		2	10	2	2	1		20	1000
Beryllium	20	0.5	2	0.5	1				1000
Cadmium	10	0.5	10	0.25	0.5				1000
Chromium (total)	50	2	10	0.5	1				1000
Chromium VI	5							10	
Copper	25	5	10	0.5	2				1000
Cyanide								5	
Lead	20	5	5	0.5	2				10,000
Mercury				0.5			0.2		
Nickel	50	5	20	1	5				1000
Selenium		5	10	2	5	1			1000
Silver	10	1	10	0.25	2				1000
Thallium	10	2	10	1	5				1000
Zinc	20		20	1	10				1000

* The normal method-specific factor for these substances is 1, therefore, the lowest standard concentration in the calibration curve is equal to the above ML value for each substance.

Table 2d - PESTICIDES – PCBs*	GC
4,4'-DDD	0.05
4,4'-DDE	0.05
4,4'-DDT	0.01
a-Endosulfan	0.02
a-Hexachloro-cyclohexane	0.01
Aldrin	0.005
b-Endosulfan	0.01
b-Hexachloro-cyclohexane	0.005
Chlordane	0.1
d-Hexachloro-cyclohexane	0.005
Dieldrin	0.01
Endosulfan Sulfate	0.05
Endrin	0.01
Endrin Aldehyde	0.01
Heptachlor	0.01
Heptachlor Epoxide	0.01
Lindane(g-Hexachloro-cyclohexane)	0.02
PCB 1016	0.5
PCB 1221	0.5
PCB 1232	0.5
PCB 1242	0.5
PCB 1248	0.5
PCB 1254	0.5
PCB 1260	0.5
Toxaphene	0.5

* The normal method-specific factor for these substances is 100, therefore, the lowest standard concentration in the calibration curve is equal to the above ML value for each substance multiplied by 100.

Techniques:

GC - Gas Chromatography
GCMS - Gas Chromatography/Mass Spectrometry
HRGCMS - High Resolution Gas Chromatography/Mass Spectrometry (i.e., EPA 1613, 1624, or 1625)
LC - High Pressure Liquid Chromatography
FAA - Flame Atomic Absorption
GFAA - Graphite Furnace Atomic Absorption
HYDRIDE - Gaseous Hydride Atomic Absorption
CVAA - Cold Vapor Atomic Absorption
ICP - Inductively Coupled Plasma
ICPMS - Inductively Coupled Plasma/Mass Spectrometry
SPGFAA - Stabilized Platform Graphite Furnace Atomic Absorption (i.e., EPA 200.9)
DCP - Direct Current Plasma
COLOR - Colorimetric

APPENDIX 5

Special Studies

Pre-Evaluation for Special Studies
Decision Tree with Attached Narrative Discussion

A special study is sometimes conducted as part of a regulatory process (standard setting and permit writing) and may be conducted as part of a collaborative watershed planning effort. Special studies can provide site-specific data that can assist in decision-making regarding water quality and beneficial use issues.

Many water quality problems may be best addressed on a watershed or water body basis. The SWRCB believes that stakeholders should be able to develop flexible and innovative solutions for water quality problems in their watershed. For special studies conducted as part of a watershed management plan, the watershed management group should be involved in the design of the study, and study information should be provided back to the committee. Watershed or water body studies may gather data regarding topics such as:

- TMDLs, WLAs, and LAs (see Appendix 6);
- Regional ambient monitoring (regional ambient monitoring is the collection of scientific information regarding water quality and impacts to beneficial uses for a specified portion of, or an entire, watershed or water body); and
- Contaminant fate and transport monitoring (contaminant fate and transport monitoring is the gathering of scientific information regarding how a specific pollutant[s] moves through the environment and how the pollutant[s] degrades or is otherwise transformed in the environment).

These types of studies are useful to collect integrated, comprehensive, and systematic data regarding:

- Baseline concentrations of toxic pollutants in the water and sediment;
- Seasonal, annual, and long-term trends in water quality;
- Causes and effects of water quality problems;
- Effectiveness of a water quality control effort;
- Greater certainty regarding existing monitoring data; etc.

Any of the studies discussed below may be undertaken as part of a watershed approach to addressing regional water quality issues. Information collected as part of a watershed or water

body study can be used as a way to define parameters (e.g., ambient background concentrations, mixing zones, etc.) related to the development of effluent limitations as part of the permitting process or to evaluate whether changes in water quality standards are appropriate. A watershed or water body approach is also useful to dischargers because information collected as a part of one effluent limitation or standard-setting study can be shared with other stakeholders in the same water body.

Studies for Setting Effluent Limitations

Studies regarding establishing effluent limitations can be done as part of the permitting process. Such studies may be simpler and there may be fewer interested stakeholders than studies involving more than one discharger, or an entire water body or watershed. However, when such studies are undertaken individually, the discharger, the RWQCB, and other stakeholders do not gain the benefit of data collected from others in the watershed.

Special studies may address topics such as the following:

- Determining pollutants requiring effluent limitations (see section 1.3);
- Metals translators (see section 1.4.1); or
- Mixing zones (see section 1.4.2).

Studies For Changes to Water Quality Standards

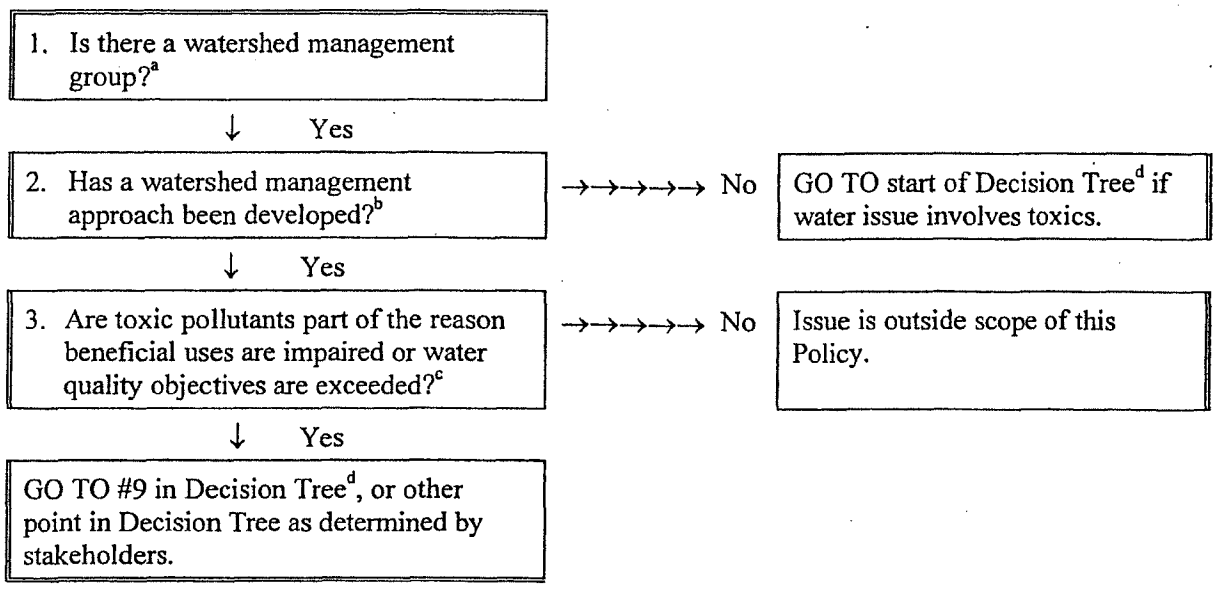
Establishing or modifying water quality standards (i.e., beneficial uses and water quality criteria/objectives) may involve complex and resource intensive studies. A detailed workplan will normally be needed because early planning and coordination with the RWQCB and U.S. EPA is critical to the development of a successful study. In addition, a workplan will normally be appropriate because there will be more stakeholder interest and involvement of other public agencies (e.g., Department of Fish and Game, U.S. Fish and Wildlife Service, etc.). Involvement in a watershed management planning effort would facilitate the sharing of information among stakeholders in the watershed, both in gathering information for the study and in sharing the results. Studies related to changes in water quality standards may address topics such as the following:

- Site-specific objective studies (see section 5.2); and
- Use attainability analysis (UAA) (see section 5.2).

Pre-Evaluation

As a first step in determining whether and how to conduct a special study, the RWQCB or other stakeholders may want to evaluate whether it would be appropriate to address a water quality

issue through a watershed management approach. To do that, the factors in the following flowchart may be considered:



The decision tree and associated narrative discussion in Appendix 5 are provided to assist RWQCBs and stakeholders in identifying whether there is a current or potential water quality issue requiring attention [Compliance Status], the nature of the identified water quality issue [Screening-level Evaluation], and possible action to address the issue [Potential Options].

Based on this information, the RWQCB and stakeholders can determine whether a special study is needed and the scope of the study. This approach can help avoid initiation of costly and time-consuming studies which are not appropriately designed to resolve the specific issue in question. The decision tree is not meant to preclude the exploration of any other creative solutions; it is meant to encourage constructive dialogue among stakeholders.

Two specific considerations should be kept in mind when conducting the pre-evaluation suggested by this decision tree. First, users must be familiar with the quality of the data under review and the potential need to augment data which are not of adequate quality. Second, users should know what the existing beneficial uses are (i.e., uses attained since 1975).

---

[a] Is there a committee of local interests in both the public and private sectors that are actively involved in the management of the watershed area?

[b] Has a watershed management approach that identifies key issues, boundaries, objectives, and early actions been developed?

[c] A study may be necessary to determine whether toxics are part of the cause of the impairment of beneficial uses. This Policy applies only to the CTR and NTR criteria, and applicable chemical-specific basin plan objectives for priority toxic pollutants.

[d] The decision tree is on page APPENDIX 5 - 6.

Special Studies Process

A. Workplan

If appropriate, the RWQCB may participate in developing a detailed workplan with interested persons (which can include, but are not limited to, U.S. EPA, the RWQCB, the SWRCB, and affected dischargers) prior to proceeding with a special study. The workplan may include the following elements:

(1) Formation of a project team for the workplan, which may include the Department of Fish and Game, the U.S. Fish and Wildlife Service, and other stakeholders;

(2) Purpose of the workplan;

(3) Responsibilities of the persons associated with the workplan;

(4) Budget and cost-sharing plan. This plan must be determined on a case-by-case basis; however, the SWRCB encourages sharing of costs (based on availability of funding), where there are multiple persons who wish to support the goals of the study;

(5) Development of the following elements:

(a) Identification of tasks(s),
(b) Purpose of tasks(s),
(c) Method by which task(s) will be implemented,
(d) Products of the tasks(s),
(e) Schedule for the task(s),
(f) Responsibility for implementing the task(s), and
(g) Budget and funding for the task(s);

(6) Administrative policies and procedures to govern oversight of the special studies process (e.g., amending the workplan, conflict resolution, etc.); and

(7) Project schedule.

B. Scientific Review Panel

If, during the data interpretation phase of a special study, the RWQCB, SWRCB, U.S. EPA, or other stakeholders have differing opinions with regard to the interpretation of data, the RWQCB and stakeholders may want to seek the advice of an independent scientific review panel. The method of selecting the panel, cost reimbursement, and other details regarding the conflict resolution process could be included in the workplan.

C. Compliance Schedule

A permit compliance schedule (as described in section 2.1) may allow sufficient time for collection of data, completion of a study, and determination of compliance measures. While special studies are being conducted, interim requirements may be established by the RWQCB (as described in section 2.2). However, in no event may a compliance schedule exceed the time period allowed in this Policy, unless an exception has been granted.

D. Environmental and Economic Impacts

To ensure that environmental and economic impacts are adequately addressed, the RWQCB staff shall, as part of the special study workplan:

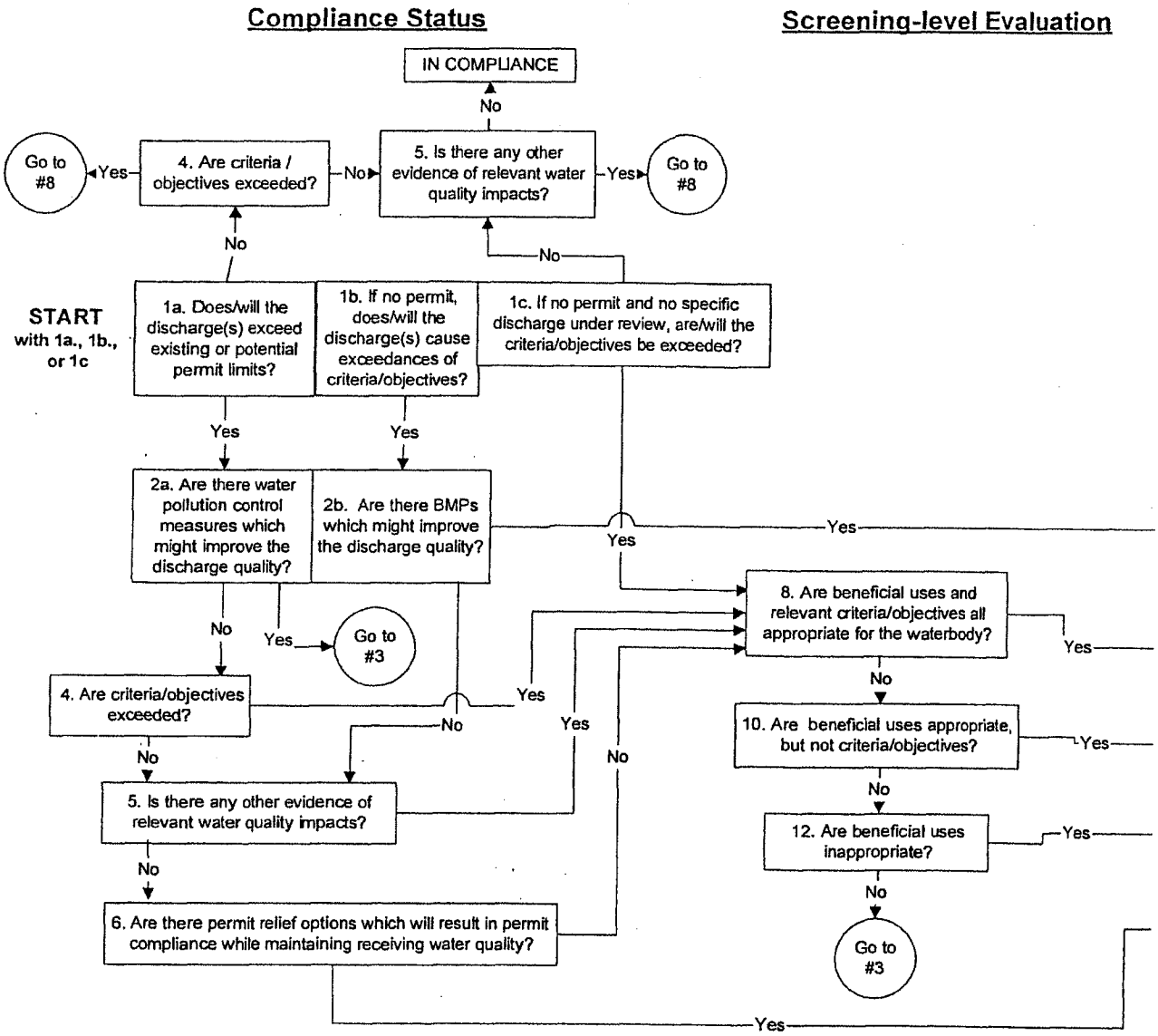
(1) Comply with CEQA, if applicable; and

(2) Direct the preparation of an analysis documenting economic impacts if site-specific objectives or a change in designated beneficial uses is being considered under 40 CFR 131.10(g)(6), revised as of July 1, 1997.

E. Antidegradation and Other Legal Requirements

RWQCB staff shall, as part of the special study workplan, ensure compliance with SWRCB Resolution No. 68-16 (Statement of Policy with Respect to Maintaining High Quality of Waters in California) and any other applicable legal requirements.

Pre-Evaluation for Special Studies
Decision Tree with Attached Narrative Discussion



Narrative Discussion of Decision Tree:

1a. Does/will a discharge exceed existing or potential permit limits for toxic pollutants? This question applies to discharges regulated by a National Pollutant Discharge Elimination System (NPDES) permit or Waste Discharge Requirements (WDRs). If the discharge(s) in question is not regulated by a discharge permit, proceed to #1b. It is assumed that data used to answer this question are reliable.

1b. If no permit, does the discharge(s) cause exceedances of criteria/objectives? This question primarily applies to nonpoint discharges, though it could conceivably apply to point source discharges which are not currently permitted. It is assumed that data used to answer this question are reliable.

1c. If no permit and no specific discharge(s) are under review, are criteria/objectives exceeded? It is assumed that data used to answer this question are reliable.

2a. Are there water pollution control measures which might improve the water quality? A water pollution control program may include, as appropriate: pollution control technologies; pretreatment requirements; and pollution prevention, waste minimization, and source control measures. This question is meant to elicit consideration of effluent quality control measures which could be implemented as a full or partial solution to the identified permit noncompliance issue. It is not intended as a barrier to the exploration of other potential forms of regulatory adjustment.

2b. Are there Best Management Practices (BMPs) which might improve water quality? BMPs are pollution management measures designed to reduce the water quality impacts, where they exist, associated primarily with non-point source discharges. As with #2a above, this question is meant to elicit consideration of discharge control measures which could be implemented as a full or partial solution to the identified noncompliance issue. It is not intended as a barrier to the exploration of other potential forms of regulatory adjustment.

3. Consider whether implementation of water pollution control measures and/or BMPs will lead to compliance. Simultaneously, continue to #4 if deemed appropriate, considering such questions as whether or not full compliance will be achieved by these means, or whether it would be cost effective. As stated, the simple determination that implementation of pollution control measures and/or BMPs might improve the discharge or water quality should not preclude the exploration of other potential regulatory adjustment options, as well. For clarity, the reviewer should proceed not to box four prime, but to box four.

4. Are criteria/objectives exceeded? It is assumed that data used to answer this question are reliable and appropriate hardness adjustments have been made.

5. Is there any other evidence of relevant water quality impacts? This question is meant to capture those situations where the criteria/objective for the pollutant of concern do not exist

or appear to be under protective. "Other evidence" might include: bioconcentration or biocriteria data, population studies, food web analyses, etc. Impacts to wildlife should be considered as should impacts to threatened and endangered species. The potential for impacts to be of a seasonal nature should also be considered in this pre-evaluation. "Relevant water quality impacts" are those impacts which have a demonstrable relationship to the pollutant(s) of concern.

6. Are there permit relief options which will result in permit compliance while maintaining receiving water quality? Permit relief options might include, where appropriate: development of a mixing zone, modification of the averaging periods, adoption of a variance, etc. For unpermitted discharges or pre-evaluations involving no specific discharges, the user should continue to box #8.

7. Implement permit relief options. Continue to #8 if full compliance will not be achieved by these means. The development of permit relief options would occur through a request to the RWQCB.

8. Are beneficial uses and criteria/objectives both appropriate for the water body? To answer this question, a screening-level evaluation may be necessary, including an evaluation of the associated regulatory history, the site-specific conditions, and the status of current, applicable scientific understanding. It is assumed that data used to answer this question are reliable.

   This question is best answered when a watershed stakeholder group has formed and collectively either: 1) evaluated the condition of the watershed through a watershed management plan, 2) evaluated the condition of the watershed through less formal means, or 3) convened discussions regarding the condition of the watershed. If one does not currently exist, a watershed stakeholder group should be formed if it appears to be a useful forum for discussion and review. The following more specific questions may apply:

   - Is the water effluent dominated, agricultural drainage water dominated, etc.? These water bodies may be likely candidates for the appropriate application of regulatory adjustments (e.g., SSO or UAA).

   - Were the current beneficial uses applied on a national, state-wide, or region-wide basis or have they been specifically designated for the water body in question? While not the only candidates, water bodies for which beneficial uses have been applied on a national, state-wide, or region-wide basis may be candidates for the appropriate application of regulatory adjustments (e.g., SSO).

   - Are there rare, threatened, or endangered species, or ecological conditions which the currently applied beneficial uses do not adequately describe or the water quality objectives do not fully protect?

   - Has the beneficial use and the water quality necessary to maintain the beneficial use been attained since 1975?

- How do anti-degradation requirements apply?

- Are elevated constituents the result of 1) natural phenomena or 2) anthropogenic activities that ceased prior to 1975?

- Do the currently designated beneficial uses protect all existing and appropriate potential uses?

- Are natural, ephemeral, intermittent, or low flow conditions or water levels preventing the attainment of the designated non-existing uses?

- Are there human-caused conditions or sources of pollution which prevent attainment of the uses but either cannot be remedied or would cause greater environmental damage if corrected?

- Does the presence of dams, diversions, or other types of hydrologic modifications preclude the attainment of designated non-existing beneficial uses?

- Do the physical conditions of the water body preclude attainment of aquatic life protection uses (i.e., lack of proper substrate, cover, flow, depth, pools, riffles, and the like)?

- Does attainment of designated beneficial uses require the application of controls which would result in substantial and widespread economic and social impact?

- Have the appropriate water characteristics (e.g., hardness, pH) been accounted for in the CTR criteria?

- Has an appropriate set of species been evaluated in setting the CTR criteria and toxicity objective?

9. Conduct a total maximum daily load analysis and implement the results. Conducting a TMDL could result in, among other things, waste load allocations, BMP implementation for non-point dischargers, and/or effluent trading options for point and non-point source dischargers. (See Appendix 6 regarding TMDLs.)

10. Are beneficial uses appropriate but not criteria/objectives for toxic pollutants? See #8 above.

11. Conduct a site-specific objectives analysis. An SSO study will include one or more of the following activities:

    - Recalculation of objective;
    - Water effects ratio or other similar method; or
    - Any scientifically defensible process.

U.S. EPA's "Guidelines for Deriving Numerical Aquatic Site Specific Water Quality Criteria by Modifying National Criteria," dated 1984 (EPA-600/3-84-099), provides guidance for conducting an SSO study.

U.S. EPA's "Water Quality Standards Handbook," dated 1994, also provides general guidance in this area.

12. Are beneficial uses inappropriate? See #8 above.

13. Conduct a use attainability analysis (UAA) and implement the results. When a use is proposed for dedesignation, i.e., removed or replaced with a subcategory requiring less stringent standards, a UAA is necessary. In a case where a use is proposed to be added, a UAA is not necessary. A new use designation can be added for a water body following the normal public review process. A UAA will determine if physical, chemical, and/or biological factors affect the attainability of a designated use via a water body survey and assessment. An analysis of economic factors can also be included to determine whether substantial and widespread economic and social impacts would be caused by stringent pollution control requirements.

    U.S. EPA's "Technical Support Manual: Water body Survey and Assessment for Conducting Use Attainability Analyses," dated 1983, provides guidance for conducting a UAA as does Region 9's Interim Final "Guidance for Modifying Water Quality Standards and Protecting Effluent-Dependent Ecosystems," dated 1992. U.S. EPA's "Water Quality Standards Handbook," dated 1994, also provides general guidance in this area.

APPENDIX 6

Watershed Management and TMDLs

Watershed Management

The SWRCB will utilize and promote, to the extent feasible, a watershed approach to address water quality issues involving toxic pollutants. Compared to the more traditional, programmatic approach to water management, the watershed approach can look at all types of pollution and all sources of pollution. One consequence of the more global perspective is that attention can be trained on the most effective strategies for management (rather than the most programmatically expedient). Another consequence is that a much larger universe of interested persons becomes important to the management of water quality, and the ability to work with these people creates added value for water management. In utilizing the watershed approach, the SWRCB will work to marshall the expertise and resources of other agencies and the private sector to collaboratively manage water quality.

In a collaborative, stewardship effort, local interests are engaged with State and federal interests, and land managers, to work with water managers to solve complex resource management problems. A watershed perspective can also enhance interagency coordination by focusing programs on resource needs throughout the watershed.

Watershed management is an integrated holistic approach for restoring and protecting aquatic ecosystems and protecting human health in a geographic area. Watershed management may include diverse issues as defined by the watershed's stakeholders (persons with some interest in the watershed) to ensure comprehensive solutions. It reflects a growing consensus that many of the existing water quality problems can be best addressed by a more integrated, basin-wide approach. The purpose of watershed management is variously viewed as (1) a method for increasing participation at the local level in water quality protection, (2) an approach to reducing the impact of nonpoint sources, (3) a strategy for integrating management of all components of aquatic ecosystems, and (4) a process for optimizing the cost effectiveness of a blend of point and nonpoint source control efforts.

Whichever purpose or blend of purposes predominates, watershed management is not a new centralized program that competes with or replaces existing programs. The significant advantage of the watershed management approach is that it encourages a collaborative, stewardship-driven process where diverse interests (individuals, landowners, farmers, POTWs, industries, environmentalists, and agencies) can work in conjunction with SWRCB and RWQCB staff to develop a consensus on, and share responsibility for, addressing water quality problems. The watershed approach assumes all stakeholders are brought to the table; therefore, there should be one watershed group that can develop a plan for the watershed that addresses the interests of stakeholders in the watershed. Furthermore, watershed management provides a mechanism for considering social and economic interests, in the context of resolving water quality issues. The SWRCB and RWQCBs will work to preserve the integrity of the watershed process and facilitate an open and timely resolution of issues.

In some cases, there is no active watershed management group that has evolved far enough to have identified key issues, boundaries, objectives, and early actions. In these instances, a group of government agencies may work together to define the conditions in a water body and to identify the specific parameters contributing to beneficial use impairments. In any event, the RWQCBs may have to act more or less independently to meet legal requirements using primarily in-house staff. Participation from other interested persons, under these circumstances, is accomplished through the SWRCB and RWQCB public hearing processes.

Watershed management planning and implementation actions will occur primarily at the RWQCB and local level. However, the SWRCB will provide training in stewardship and watershed management, and support educational efforts involving K through 12 programs as well as land owners/managers.

TMDLs and Watershed Management

TMDLs are required for all waters listed pursuant to CWA Section 303(d)(1)(A). The SWRCB is committed to expeditiously addressing these water quality problems.

A TMDL establishes the amount of a pollutant that may be discharged into a water body and still maintain water quality standards with seasonal variations and a margin of safety that takes into account any lack of knowledge concerning the relationship between effluent limitations and water quality. The TMDL process is defined in federal regulations (40 CFR 130.7, revised as of July 1, 1996) and generally consists of five steps:

(1) Identification by each state of water quality-limited waters that do not now, or are not expected to, attain state water quality standards after implementation of technology-based effluent limitations, more stringent effluent limitations required by federal, State, or local authority, and other pollution control requirements (e.g., best management practices) required by local, State, or federal authority, and identification of impairment;

(2) Establishment of priority rankings for the development of TMDLs;

(3) Development of waste load allocations (WLAs), load allocations (LAs), and TMDLs;

(4) Incorporation of the loadings in the RWQCB basin plans; and

(5) Submittal of segments identified, priority ranking, and loads established to U.S. EPA for approval.

Development of TMDLs can utilize the watershed approach to assess and identify water quality-limited segments and pollutants causing impairment, identify sources, and allocate pollutant loads. The watershed approach may address a broader range of issues than the TMDLs, but the approach can: (1) result in achieving or maintaining water quality standards so that waters are not added to the 303(d) list; (2) result in attainment of water quality standards, through means other than the TMDL process, so that waters can be removed from the 303(d) list; or (3) be used to develop TMDLs. A watershed group can develop a TMDL if the TMDL complies with applicable federal requirements.

EXHIBIT “17”

STATE OF CALIFORNIA
CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SANTA ANA REGION

ORDER NO. R8-2010-0033
NPDES NO. CAS 618033

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT AND WASTE DISCHARGE REQUIREMENTS FOR THE RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT, THE COUNTY OF RIVERSIDE, AND THE INCORPORATED CITIES OF RIVERSIDE COUNTY WITHIN THE SANTA ANA REGION

AREA-WIDE URBAN RUNOFF MANAGEMENT PROGRAM

The following Discharger(s) are subject to waste discharge requirements as set forth in this Order:

Table 1. Municipal Permittees (Dischargers)

Principal Permittee	Riverside County Flood Control and Water Conservation District (RCFC&WCD)*	
Co–Permittees	1. Beaumont	9. Moreno Valley
	2. Calimesa	10. Murrieta
	3. Canyon Lake	11. Norco
	4. Corona	12. Perris
	5. County of Riverside (County)	13. Riverside
	6. Hemet	14. San Jacinto
	7. Lake Elsinore	15. Wildomar
	8. Menifee	

The Principal Permittee and the Co-Permittees are collectively referred to as the Permittees or the Dischargers.

Table 2. - Administrative Information

This Order was adopted by the Regional Water Board on:	**January 29, 2010**
This Order will become effective on:	**January 29, 2010**
This Order will expire on:	**January 29, 2015**
The U.S. Environmental Protection Agency (USEPA) and the California Regional Water Quality Control Board have classified this discharge as a major discharge.	
The Discharger must file a Report of Waste Discharge in accordance with Title 23, California Code of Regulations, as application for issuance of new waste discharge requirements no later than 180 days in advance of the Order expiration date.	

IT IS HEREBY ORDERED, that this Order supersedes Order No. R8-2002-0011 except for enforcement purposes, and, in order to meet the provisions contained in Division 7 of the California Water Code (CWC) and regulations adopted there under, and the provisions of the federal Clean Water Act (CWA), and regulations and guidelines adopted there under, the Permittees must comply with the requirements in this Order.

I, Gerard J. Thibeault, Executive Officer, do hereby certify that this Order No. R8-2010-0033 with all attachments is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, Santa Ana Region, on January 29, 2010.

Gerard J. Thibeault, Executive Officer

Intentionally Blank

TABLE OF CONTENTS

I. FACILITY INFORMATION 6
II. FINDINGS 8
A. BACKGROUND 8
B. LEGAL AUTHORITIES 10
C. RATIONALE FOR REQUIREMENTS 14
D. CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA) 14
E. DISCHARGE CHARACTERISTICS 15
F. CWA SECTION 303(D) LISTED WATERBODIES AND TMDLs 23
G. NEW DEVELOPMENT/SIGNIFICANT REDEVELOPMENT – WQMP /LID 28
H. CO-PERMITTEE INSPECTION PROGRAMS 34
I. ILLICIT CONNECTIONS/ ILLEGAL DISCHARGES (IC/ID) 35
J. TECHNOLOGY-BASED EFFLUENT LIMITATIONS (Not Applicable) 36
K. WATER QUALITY-BASED EFFLUENT LIMITATIONS (WQBELs) AND TMDL WLA 36
L. WATER QUALITY CONTROL PLAN (BASIN PLAN) 39
M. NATIONAL TOXICS RULE (NTR) AND CALIFORNIA TOXICS RULE (CTR) 41
N. STATE IMPLEMENTATION POLICY (SIP) 41
O. COMPLIANCE SCHEDULES AND INTERIM REQUIREMENTS 41
P. ANTIDEGRADATION POLICY 42
Q. ANTI-BACKSLIDING 42
R. PUBLIC EDUCATION/PARTICIPATION 42
S. PERMITTEE FACILITIES AND ACTIVITIES 43
T. MUNICIPAL CONSTRUCTION PROJECTS 44
U. MONITORING AND REPORTING 45
V. STANDARD AND SPECIAL PROVISIONS 46
W. NOTIFICATION OF INTERESTED PARTIES 47
X. CONSIDERATION OF PUBLIC COMMENT 47
Y. ALASKA RULE 47
Z. COMPLIANCE WITH CZARA 47
AA. NON-POINT SOURCE DISCHARGES 47
BB. STRINGENCY REQUIREMENTS FOR INDIVIDUAL POLLUTANTS. (N/A) 48
CC. FISCAL RESOURCES 48
III. PERMITTEE RESPONSIBILITIES: 49
A. RESPONSIBILITIES OF THE PRINCIPAL PERMITTEE: 49
B. RESPONSIBILITIES OF THE CO-PERMITTEES: 52
C. IMPLEMENTATION AGREEMENT 54
IV. LOCAL IMPLEMENTATION PLAN: 54
V. DISCHARGE PROHIBITIONS: 57
VI. EFFLUENT LIMITATIONS, DISCHARGE SPECIFICATIONS AND OTHER TMDL RELATED REQUIREMENTS 57
A. ALLOWED DISCHARGES: 57

B. DISCHARGE SPECIFICATIONS FOR DISCHARGES FROM PERMITTEE OWNED AND/OR OPERATED FACILITIES AND ACTIVITIES - DE-MINIMUS DISCHARGES: 59
C. NON-POINT SOURCE (NPS) DISCHARGES: 61
D. WATER QUALITY BASED EFFLUENT LIMITATIONS TO IMPLEMENT THE TOTAL MAXIMUM DAILY LOADS (TMDLS) 61
1. The MIDDLE SANTA ANA RIVER (MSAR) WATERSHED BACTERIA INDICATOR TMDL 61
2. LAKE ELSINORE/CANYON LAKE (SAN JACINTO WATERSHED) NUTRIENT TMDLS 65
VII. RECEIVING WATER LIMITATIONS 69
VIII. LEGAL AUTHORITY/ENFORCEMENT 71
IX. ILLICIT CONNECTIONS/ILLEGAL DISCHARGES (IC/ID); LITTER, DEBRIS AND TRASH CONTROL 74
X. SEWAGE SPILLS, INFILTRATION INTO THE MS4 SYSTEMS FROM LEAKING SANITARY SEWER LINES, SEPTIC SYSTEM FAILURES, AND PORTABLE TOILET DISCHARGES 76
XI. CO-PERMITTEE INSPECTION PROGRAMS 76
A. GENERAL REQUIREMENTS 76
B. CONSTRUCTION SITES 79
C. INDUSTRIAL FACILITIES 80
D. COMMERCIAL FACILITIES 81
E. RESIDENTIAL PROGRAM 83
XII. NEW DEVELOPMENT (INCLUDING SIGNIFICANT REDEVELOPMENT) 84
A. GENERAL REQUIREMENTS: 84
B. WATERSHED ACTION PLAN 85
C. INCORPORATION OF WATERSHED PROTECTION PRINCIPLES INTO PLANNING PROCESSES 87
D. WATER QUALITY MANAGEMENT PLAN (WQMP) FOR URBAN RUNOFF (FOR NEW DEVELOPMENT/ SIGNIFICANT REDEVELOPMENT): 89
E. LOW IMPACT DEVELOPMENT (LID) AND HYDROMODIFICATION MANAGEMENT TO MINIMIZE IMPACTS FROM NEW DEVELOPMENT/SIGNIFICANT REDEVELOPMENT PROJECTS: 93
F. ROAD PROJECTS 97
G. ALTERNATIVES AND IN-LIEU PROGRAMS 98
H. APPROVAL OF WQMP 100
I. FIELD VERIFICATION OF BMPS 100
J CHANGE OF OWNERSHIP AND RECORDATION 100
K. OPERATION AND MAINTENANCE OF POST-CONSTRUCTION BMPS 101
L. PRE-APPROVED PROJECTS 102
XIII. PUBLIC EDUCATION AND OUTREACH 102
XIV. PERMITTEE FACILITIES AND ACTIVITIES 104
G. PERMITTEE COMPLIANCE WITH GENERAL PERMITS 106
1. GENERAL CONSTRUCTION PERMIT 106

2. GENERAL DE-MINIMUS PERMIT DISCHARGES 107
XV. TRAINING PROGRAM FOR STORM WATER MANAGERS, PLANNERS, INSPECTORS AND MUNICIPAL CONTRACTORS 107
XVI. NOTIFICATION REQUIREMENTS 109
XVII. PROGRAM MANAGEMENT ASSESSMENT/DAMP REVIEW 111
XVIII. FISCAL RESOURCES 112
XIX. MONITORING AND REPORTING PROGRAM 112
XX. PROVISIONS 112
XXI. PERMIT MODIFICATION 114
XXII. PERMIT EXPIRATION AND RENEWAL 115

LIST OF TABLES

Table 1. Municipal Permittees (Dischargers) 1
Table 2. Administrative Information 1
Table 3a – Receiving Waterbodies and Municipal Dischargers: 16
Table 3b. Beneficial Uses and 2006 CWA Section 303(d) Impaired Waters 17
Table 4 - Impaired Waterbodies 23
Table 5 - Middle Santa Ana River Bacterial Indicator TMDL Task Force 25
Table 6 - Canyon Lake and Lake Elsinore Nutrient TMDL Task Force 28
Table 7 - Lake Elsinore In-lake Sediment Nutrient Reduction Strategy 65
Table 8 - Lake Elsinore/Canyon Lake Model Update Plan 66
Table 9 - Canyon Lake Nitrogen and Phosphorus Waste Load and Load Allocations 68
Table 10- Lake Elsinore Nitrogen and Phosphorus Waste Load and Load Allocations 68

LIST OF APPENDICES

Appendix Number	DESCRIPTION
1	Permit Area
2	Other Entities that May Discharge Pollutants to the MS4
3	Monitoring And Reporting Program
4	Glossary
5	Notice of Intent and Notice of Termination for Construction Activities
6	Fact Sheet
7	Notice of Intent and Notice of Termination for De-Minimus Discharges

I. FACILITY INFORMATION

A. Each of the municipalities listed in Table 1, above, hereinafter called Permittees, owns and/or operates portions of the municipal separate storm sewer system (MS4[1]), through which Urban Runoff is discharged into Waters of the United States (Waters of the US) that are located within the jurisdiction of the Santa Ana Regional Water Quality Control Board (Santa Ana Region). The MS4 falls into one or more of the following categories: (1) a medium or large MS4 that services a population of greater than 100,000 or 250,000 respectively; or (2) an MS4 which contributes to a violation of a Water Quality Standard; or (3) an MS4 which is a significant contributor of Pollutants to Waters of the US; or (4) an MS4 owned and/or operated by a small municipality that is interrelated to a medium or large municipality. Section 402(p) of the CWA requires that discharges of Urban Runoff from MS4 be regulated under a National Pollutant Discharge Elimination System (NPDES) permit.

B. This Order regulates the discharge of Pollutants in Urban Runoff from non-agricultural Anthropogenic sources from the MS4 that is owned and/or operated by the Permittees. The Permittees lack legal jurisdiction over discharges into their MS4 facilities from agricultural activities, State and federal facilities, public schools and hospitals, utilities, railroads, and special districts, Native American tribal lands, wastewater management agencies and other point and non-point source discharges otherwise permitted by the Regional Board. The Regional Board recognizes that the Permittees should not be held responsible for discharges from such facilities or Pollutants in those discharges. However, to the extent that the Permittees authorize the connection of these discharges into their MS4s, this Order requires the Permittees to provide written notification of Water Quality Management Plan (WQMP) requirements for post-construction best management practices (BMPs) and/or other applicable requirements of this Order. A WQMP approved by the Permittee who owns the MS4 may constitute compliance with the General Construction Permit post construction Standards[2] for the Permit Area.

C. The Co-Permittees have established legal authority to control discharges into the MS4 facilities that they own and/or operate. As owners and/or operators of the MS4, the Permittees are responsible for discharges into their MS4 facilities to the extent of their legal authority. The discharge of Pollutants into the MS4 may cause or contribute to, or threaten to cause or contribute to, a condition of Pollution in Receiving Waters. Federal regulations, 40 CFR 122.26(d)(2)(i), require the Permittees to control the discharge of Pollutants into the MS4 to the maximum extent practicable (MEP).

---

1 Note: Acronyms and capitalized terms used in this document are defined in Appendix 4.
2 The State General Construction Permit Section Order No. 2009-0009-DWQ XIII

Certain activities and sources that generate Pollutants present in Urban Runoff may be beyond the ability of Permittees to prevent or eliminate. Examples of these activities and sources include, but are not limited to: emissions from internal combustion engines, brake pad wear and tear, atmospheric deposition, bacteria and wildlife (including feral cats and dogs) and leaching of naturally occurring nutrients and minerals from local soils. This Order is not intended to address background or naturally occurring Pollutants or flows.

D. The Permittees have identified Major Outfalls and have submitted maps of existing MS4 facilities. The Co-Permittees reported having approximately 269 miles of underground storm drains, and 95 miles of channels[3]. The RCFC&WCD reported having 75 miles in underground storm drains and 59 miles of channels in the Permit Area.

E. On February 5, 2008 Wildomar residents voted for cityhood and the city incorporated on July 1, 2008. Menifee residents voted for cityhood on June 3, 2008 and the city incorporated on October 1, 2008. Both cities in letters dated May 5 and May 6, 2009, respectively, have expressed their intent to be a Co-Permittee in this Order and for the purposes of this Order shall be considered as such. Urban Runoff from the cities of Menifee, Murrieta and Wildomar discharges into watersheds within the Santa Ana Regional Board and the San Diego Regional Board jurisdictions. Therefore, these cities are regulated by MS4 permits issued by both Regional Boards. Urban Runoff from the County of Riverside and RCFC&WCD discharge into watersheds within the Santa Ana, San Diego and Colorado River Region Regional Board jurisdictions. Therefore, these entities are regulated by MS4 permits issued by three Regional Boards.

F. The Permit Area contains 1,396 square miles or 19.1% of the 7,300 square miles within Riverside County and includes 15 of the 26 municipalities within Riverside County. The more densely populated areas of Riverside County are located within the Santa Ana Regional Board's jurisdiction. The population of the Permit Area was estimated at 1,237,388 as of January 1, 2006[4]. The California Department of Finance estimates that as of January 1, 2009, the population of Riverside County was 2,107,653[5]. Other portions of Riverside County are regulated by the San Diego and the Colorado River Basin Regional Boards.

---

[3] 2008-2009 Permittee Santa Ana NPDES MS4 Annual Report.
[4] Section 3.3.1 of the 2007 ROWD (Western Riverside Council of Governments (WRCOG), Sub-regional Growth Forecast, Riverside County Projection (Revised Draft), November 22, 2006.)
[5] E-1 report dated April 30, 2009 (http://www.dof.ca.gov/research/demographic/reports/estimates/e-1/2008-09/documents/E-1_2009%20Press%20Release.pdf).

II. FINDINGS

The California Regional Water Quality Control Board, Santa Ana Region (hereinafter the "Regional Board") finds that:

A. BACKGROUND

1. The Co-Permittees own and operate flood control facilities. Some of the natural channels, streambeds and other drainage facilities that are generally considered as Waters of the U.S. have been converted to flood control facilities. In such cases, where a natural streambed is modified to convey storm water flows, the conveyance system becomes both a MS4 and a Water of the US.

2. The Permittees are currently discharging from the MS4 pursuant to Order No. R8-2002-0011, NPDES Permit No. CAS 618033. This Order renews Order No. R8-2002-0011 and regulates discharges of Urban Runoff from the MS4 within Riverside County.

3. On April 27, 2007, the RCFC&WCD, in cooperation with the County of Riverside, (the "County") and the incorporated cities of Beaumont, Calimesa, Canyon Lake, Corona, Hemet, Lake Elsinore, Moreno Valley, Murrieta, Norco, Perris, Riverside, and San Jacinto, jointly submitted a permit renewal application, a Report of Waste Discharge (the "2007 ROWD"), to renew the NPDES permit for discharges of Urban Runoff from the MS4 in the Permit Area. Subsequently, the cities of Menifee and Wildomar also signed letters of intent to include discharges from their MS4 facilities under this MS4 Permit. The County and incorporated cities are hereinafter the "Co-Permittees", and collectively with the Principal Permittee referred to as the "Permittees". The Permit Area is shown in Appendix 1 and includes the urban areas and those portions of agriculture and open space as shown on Appendix 1 that may convert to industrial, commercial, or residential use during the term of this Order.

4. To more effectively carry out the requirements of this Order, the Permittees have agreed that the RCFC&WCD will continue as the Principal Permittee and the County and the incorporated cities within the Permit Area will continue as the Co-Permittees.

5. The Permittees submitted a revised Drainage Area Management Plan ("2007 DAMP") as contained in Appendix B of the 2007 ROWD. The proposed DAMP identifies programs and policies, including best management practices (BMPs), to achieve Water Quality Standards in the Receiving Waters. These BMPs can be organized into two categories: BMPs for existing facilities and BMPs for New Development and Significant Redevelopment. Both categories include regulatory activities, public education programs, waste management, and operations and

maintenance activities. The Permittees currently implement the 2006 DAMP. With the adoption of this Order, the Permittees are required to implement the 2007 DAMP. The DAMP is a dynamic document that defines the MEP standard (see discussion of this term in the Glossary, Appendix 4) for the Permittee activities and is incorporated by reference as an enforceable element of this Order.

6. This Order requires the Permittees to revise the DAMP and associated documents to incorporate new MS4 Permit requirements which include recommendations from the 2007 ROWD. Future modifications of the DAMP, once approved by the Regional Board Executive Officer[6], are also enforceable elements of this Order.

7. During the Third Term Permit, Regional Board staff conducted an evaluation of each of the Permittees' Urban Runoff programs. This evaluation indicated that most of the Permittees lacked proper documentation of procedures and policies for implementation of various elements of their Urban Runoff program. This Order requires each Permittee to develop a Local Implementation Plan (LIP) that documents its internal procedures for implementation of the various program elements described in the DAMP and this Order.

8. On July 13, 1990, the Regional Board adopted the first term Riverside County MS4 permit, Order No. 90-104 (NPDES No. CA 8000192). On March 8, 1996, the Regional Board renewed Order No. 90-104 by adopting the second term Riverside County MS4 permit, Order No. 96-30 (NPDES No. CAS618033). On October 25, 2002, the Regional Board renewed Order No. 96-30 by adopting the third term MS4 permit, Order No. R8-2002-0011(NPDES No. CAS618033).

9. This Order renews Order No. R8-2002-0011 (NPDES No. CAS618033), and regulates discharges of Urban Runoff from the MS4 within the Permit Area in Riverside County. This Order is the fourth term permit and is intended to regulate the discharge of Pollutants in Urban Runoff from non-agricultural Anthropogenic activities and sources under the jurisdiction of and/or maintenance responsibility of the Permittees and is not intended to address background or naturally occurring Pollutants or flows.

10. The Santa Ana River Basin is the major watershed within the Santa Ana Region. The Regional Board and the Permittees recognize the importance of watershed

---

[6] The Executive Officer shall provide members of the public with notice and at least a 30-day comment opportunity for all documents submitted in accordance with this Order. If the Executive Officer, after considering timely submitted comments, concludes that the document is adequate or adequate with specified changes, the Executive Officer may approve the document or present it to the Board for its consideration at a regularly scheduled and noticed meeting. If there are significant issues that cannot be resolved by the Executive Officer, the document will be presented to the Board for its consideration at a regularly scheduled meeting.

management initiatives and regional planning and coordination in the development and implementation of programs and policies related to water quality protection.

11. It is recognized that in some cases MS4 facilities are used to convey Urban Runoff to sub-regional or regional Treatment Control BMPs or may incorporate regional BMPs directly. The Regional Board recognizes this appropriate strategy for treatment provided that Waters of the US are not used to convey Pollutants. Further, such BMPs are not considered MS4 or Waters of the US.

12. A number of regional and watershed-wide efforts are underway in which the Permittees are active participants. The Regional Board also recognizes that, in certain cases, diversion of funds targeted for certain monitoring programs to regional monitoring programs may be necessary. The Executive Officer is authorized to approve, after proper public notification and consideration of all comments received, reallocation of resources to the watershed management initiatives and regional planning and coordination programs and regional monitoring programs.

13. The Permittees are required to submit all documents, where appropriate, to the Regional Board in an electronic format. All such documents will be posted at the Regional Board's website and all interested parties will be notified. In addition, the website will include the administrative and civil procedures for appealing any decision made by the Executive Officer. Some Urban Runoff issues, such as monitoring, public education, and training can be more effectively addressed on a regional or statewide basis thereby increasing program consistency and efficiency. This Order encourages continued participation in such programs and policies.

B. LEGAL AUTHORITIES

1. This Order Is issued pursuant to Section 402 of the CWA, the Porter-Cologne Water Quality Control Act (Division 7 of the Water Code, commencing with Section 13000), applicable State and federal regulations, all applicable provisions of statewide Water Quality Control Plans and Policies adopted by the State Water Resources Control Board (State Board), the Water Quality Control Plan for the Santa Ana River Basin adopted by the Regional Board (Basin Plan), the California Toxics Rule (CTR), and the California Toxics Rule Implementation Plan. This Order also serves as Waste Discharge Requirements (WDRs) pursuant to Article 4, Chapter 4, Division 7 of the Water Code (commencing with Section 13260).

2. This Order is consistent with the following precedential Orders adopted by the State Board addressing municipal storm water NPDES Permits: Order 99-05-DWQ (Petition of Environmental Health Coalition/Receiving Water Limitation Language for Municipal Storm Water Permits), Order WQ-2000-11 (Petitions Bellflower, City of Arcadia, Western States Petroleum Association, Review of RWQCB and Its

Executive Officer Pursuant to Order 96-054, Permit for Municipal Storm Water and Urban Run-Off Discharges within Los Angeles County), Order WQ 2001-15 (In the Matter of the Petitions of Building Industry Association of San Diego County and Western States Petroleum Association), and Order WQO 2002-0014 (Petitions of Aliso Viejo, et al/Order to stay provision F.5.f of the permit and part of last sentence of Finding 26, permit issued by San Diego Regional Water Quality Control Board).

3. Consistent with the State Board's orders, this Order requires the Permittees to comply with the applicable Water Quality Standards, which is to be achieved through an iterative approach requiring the implementation of increasingly more effective BMPs until Water Quality Standards are not impaired by Urban Runoff. All MS4 permits issued in California specify certain minimum BMPs and incorporate an iterative process that requires increasingly more effective BMPs if the Water Quality Standards are not met.

4. The federal Clean Water Act established a national policy designed to help maintain and restore the physical, chemical and biological integrity of the nation's waters. In 1972, the CWA established the NPDES permit program to regulate the discharge of Pollutants from Point Sources to Receiving Waters. From 1972 to 1987, the main focus of the NPDES program was to regulate conventional Pollutant sources such as sewage treatment plants and industrial facilities. As a result, on a nationwide basis, non-point sources, including agricultural runoff and Urban Runoff, now contribute a larger portion of many kinds of Pollutants than the more thoroughly regulated sewage treatment plants and industrial facilities.

5. Studies conducted by the USEPA, the states, counties, cities, flood control districts and other entities dealing with Urban Runoff indicate that the following are major sources of Urban Runoff Pollution nationwide:

   a. Industrial Facilities where appropriate Pollution Prevention and BMPs are not implemented;

   b. Construction Sites where erosion and sediment controls and BMPs are not implemented; and,

   c. Runoff from urbanized areas.

6. The 1987 amendments to the CWA added Section 402(p) that required the USEPA to develop permitting regulations for storm water discharges from MS4 and from Industrial Facilities, including construction sites. The USEPA promulgated the final Phase I storm water regulations on November 16, 1990. Neither the 1987 amendments to the CWA nor the Phase I storm water regulations (40 CFR Part 122) have been amended since their effective dates.

7. Prior to the USEPA's promulgation of the final storm water regulations, three counties (Orange, Riverside, and San Bernardino) and their incorporated cities located within the Regional Board's jurisdiction requested area-wide NPDES MS4 permits. These area-wide MS4 NPDES permits are:

   a. Orange County, NPDES No. CAS 618030

   b. Riverside County, NPDES No. CAS 618033

   c. San Bernardino County, NPDES No. CAS 618036

8. Consistent with the CWA and the USEPA regulations promulgated pursuant thereto, the State Board and the Regional Board have adopted a number of permits to address Pollution from the sources identified in Finding 5, above. Industrial activities (as defined in 40 CFR 122.26(b)(14)) including construction activities on one or more acres are to be covered under one of the following permits and those individuals or entities that engage in such activities are required to secure permission to engage in such identified activities pursuant to the provisions of one of the following permits:

   a. State Board Order No. 97-03-DWQ, for storm water runoff from industrial activities (NPDES No. CAS000001), (the "General Industrial Activities Storm Water Permit").

   b. State Board Order No. 99-08-DWQ, for storm water runoff from construction activities (NPDES No. CAS000002), (the "General Construction Activity Storm Water Permit"). Order No. 99-08- DWQ was amended by State Board Resolution No. 2001-046 on April 26, 2001, to incorporate monitoring provisions as directed by the Superior Court, County of Sacramento. This Order was renewed on September 2, 2009 by State Board Order No. 2009-0009-DWQ. The requirements of Order No. 2009-0009-DWQ will be effective July 1, 2010.

   c. State Board Order No. 99-06-DWQ (NPDES No. CAS000003) for storm water runoff from facilities (including freeways and highways) owned and/or operated by the California Department of Transportation ("Caltrans").

   d. State Board Order No. 2003-0007-DWQ, for discharges of storm water runoff associated with small linear underground/overhead construction projects (NPDES No. CAS000005), (the "General Permit-Small Linear Underground Projects). After July 1, 2010, most linear construction projects will be regulated under State Board Order No. 2009-0009-DWQ.

   e. The Regional Board also issues individual storm water NPDES permits for certain Industrial Facilities within the Santa Ana River watershed. Currently

there is only one individual storm water NPDES permit that has been issued by the Regional Board for an Industrial Facility (March Air Reserve Base) located within the Permit Area. Additionally, the Regional Board has issued NPDES permits for a number of facilities that discharge process wastewater and storm water; storm water discharge requirements are included in such a facility's NPDES permit.

9. Section 402(p) of the CWA establishes two different performance standards for storm water discharges. NPDES MS4 permits require controls to reduce the discharge of Pollutants to the MEP. NPDES permits issued for industrial storm water discharges (including construction activities) must meet Best Available Technology (BAT) and Best Conventional Pollutant Control Technology (BCT) standards. The CWA and the USEPA regulations allow each state the flexibility to decide what constitutes the MEP.

10. This Order does not constitute an unfunded mandate subject to subvention under Article XIII.B, Section (6) of the California Constitution for several reasons, including the following:

    a. This Order implements federally mandated requirements under CWA Section 402(p)(3)(B). (33 USC § 1342(p)(3)(B)).

    b. The Permittees' obligation under this order are similar to, and in many respects less stringent than, the obligations of non-governmental dischargers who are issued NPDES permits for storm water discharges.

    c. The Permittees have the authority to levy service charges, fees, or assessments to pay for compliance with this Order[7].

    d. The Permittees requested permit coverage in lieu of compliance with the complete prohibition against the discharge of Pollutants contained in federal Clean Water Act Section 301, subdivision (a). (33 USC § 1311(a)).

11. Section 13225 of the CWC identifies the Regional Board as being the enforcement authority for NPDES permits, including the Industrial General Permit, and the Construction General Permit which are collectively referred to as the "General Stormwater Permits." However, in many areas, the Industrial Facilities and Construction Sites discharge directly into MS4 facilities owned and operated by the Permittees. These Industrial Facilities and Construction Sites are also regulated under local ordinances and regulations. The Permittees and Regional Board staff work together to avoid duplicative efforts in regulating these facilities. As part of

---

[7] Voter approval may be required for new tax levies.

this coordination, the Permittees have been notifying Regional Board staff when they observe, during their routine activities, conditions that result in a threat or potential threat to water quality, or when a required Industrial Facility or Construction Site fails to obtain coverage under the appropriate General Stormwater Permit.

12. This Order does not authorize any act that results in the taking of a threatened or endangered species or any act that is now prohibited, or becomes prohibited in the future, under either the California Endangered Species Act (Fish and Game Code Sections 2050 to 2097) or the Federal Endangered Species Act (16 U.S.C.A. Sections 1531 to 1544). This Order requires compliance with Effluent Limits, Receiving Water Limits, and other requirements to protect the Beneficial Uses of Waters of the US. The Permittees are responsible for meeting all requirements of the applicable Endangered Species Act.

13. The Permittees may petition the Regional Board to issue a separate NPDES permit to any discharger of Non-storm Water into MS4 facilities that they own or operate.

14. The Regional Board has considered anti-degradation requirements, pursuant to 40 CFR 131.12 and State Board Resolution No. 68-16, for this discharge. The Regional Board finds that the Urban Runoff regulated under this Order is consistent with the federal and state anti-degradation requirements and a complete anti-degradation analysis is not necessary. This Order requires the continued implementation of programs and policies to reduce the discharge of Pollutants in Urban Runoff. This Order includes additional requirements to control the discharge of Pollutants in Urban Runoff from "Significant Redevelopment," and "New Development," as defined in Finding II.G. and Section XII of this Order.

C. RATIONALE FOR REQUIREMENTS

1. The Regional Board developed the requirements in this Order based on information submitted as part of the 2007 ROWD (including the 2007 DAMP), monitoring and reporting data, program audits, and other available information and consistent with the CWA, CWC and regulations adopted thereunder.

2. The Fact Sheet (Appendix 6) which contains additional background information and rationale for requirements specified in this Order is hereby incorporated into this Order and constitutes part of the Findings for this Order. Appendices 1 through 5 and 7 are also incorporated into this Order.

D. CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA)

1. Under Water Code Section 13389, this action to adopt an NPDES permit is exempt from the provisions of CEQA, Public Resources Code Sections 21100 -21177 (*County of Los Angeles v. California State Water Resources Control Board* [2006] 142 Cal Appl. 4th 985, mod. [Nov. 6, 2006, B184034] 50 Cal. Rptr 3rd 619, 632-636). This action also involves the re-issuance of WDRs for existing facilities and as such, is exempt from the provisions of CEQA (commencing with Section 21100) in that the activity is exempt pursuant to Title 14 of the California Code of Regulations Section 15301.

2. Compliance with this Order and the DAMP does not necessarily constitute mitigation that is sufficiently specific to satisfy the requirements of CEQA with regards to projects. The intent of the DAMP, WQMP, Storm Water Pollution Prevention Plan (SWPPP) and other programs and policies incorporated into this order is to minimize the impacts from a specific project to a level that is below significance as defined in CEQA.

E. DISCHARGE CHARACTERISTICS

1. This Order regulates Urban Runoff from areas under the jurisdiction of the Permittees. The term Urban Runoff as used in this Order includes storm water runoff, snowmelt runoff and surface runoff and drainage as defined in Appendix 4.
2. Pollutants in Urban Runoff can threaten and adversely affect human health and the environment. Human illnesses have been clearly linked to recreating near storm drains flowing into coastal waters[8]. Also, Pollutants in Urban Runoff can bioaccumulate in receiving waters in the tissues of invertebrates and fish and eventually consumed by humans and other animals.
3. Urban Runoff can carry Pollutants described in the Fact Sheet to rivers, streams, and lakes within the Permit Area (collectively the "Receiving Waters"). In addition, although infrequently, Urban Runoff from the Permit Area can carry these Pollutants to other receiving waters such as the Pacific Ocean.
4. Management of Dry Weather discharges resulting from urbanization provides an opportunity to promote water conservation as well as address water quality.
5. The Co-Permittees discharge Urban Runoff into lakes, drinking water reservoirs, rivers, streams, creeks, and tributaries thereto within the Upper Santa Ana River, Middle Santa Ana River, and San Jacinto hydrologic units within the Santa Ana Region, as shown in Tables 3a and 3b. Some of the Receiving Waters have been designated as Impaired by the Regional Board and the USEPA pursuant to CWA Section 303(d).

---

[8] The Santa Monica Bay Restoration Project, Epidemiology Study, 1996.

Table 3a – Receiving Waterbodies and Municipal Dischargers:

	Upper Santa Ana									San Jacinto								
Municipality	**Mill Creek Prado Area**	**Chino Creek, Reach 1A**	**Chino Creek, Reach 1B**	**Temescal Creek**	**San Timoteo Wash**	**Little San Gorgonio**	**Santa Ana River, Reach 3**	**Santa Ana River, Reach 4**	**Cucamonga Creek**	**San Jacinto River reaches 1-4**	**Lake Elsinore**	**Canyon Lake**	**Strawberry Creek**	**Lake Hemet**	**Salt Creek**	**Poppet Creek**	**Indian Creek**	**Bautista Creek**
RCFC&WCD				◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
Beaumont					◆	◆	⌘	⌘		◆	⌘		◆					
Calimesa					◆	⌘	⌘	⌘		◆	⌘	◆	◆					
Canyon Lake				⌘			⌘			⌘	⌘	◆						
Corona				◆			⌘											
County of Riverside (County)	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
Hemet				⌘			⌘			⌘	⌘	⌘			⌘			
Lake Elsinore				◆			⌘			⌘	◆							
Menifee				⌘			⌘			⌘	⌘	⌘			⌘			
Moreno Valley				⌘			⌘			⌘	⌘	⌘						
Murrieta				⌘			⌘				⌘							
Norco				⌘			◆											
Perris				⌘			⌘			◆	⌘	⌘			⌘			
Riverside				⌘			◆	◆			⌘							
San Jacinto										◆	⌘	⌘						
Wildomar				⌘			⌘				⌘							

◆ Direct Discharge of MS4 to Receiving Water
⌘ Tributary to Receiving Water

Intentionally Blank

Table 3b. Beneficial Uses and 2006 CWA Section 303(d) Impaired Waters

Watershed Management Areas in Riverside County	Hydraulic Unit	Beneficial Uses
Upper Santa Ana River		
Santa Ana River, Reach 3,	801.21, 801.25, 801.27,	AGR, GWR, REC1, REC2, WARM, WILD, RARE, SPWN
Santa Ana River, Reach 4	801.27, 801.44	GWR, REC1, REC2, WARM, WILD, SPWN
Temescal Creek – Reach 1	801.25	REC1, REC2, WARM, WILD
Temescal Creek – Reach 2	801.32, 801.25	INTERMITTENT - AGR, IND, GWR, REC1, REC2, LWARM
Temescal Creek – Reach 3 **See Lee Lake**		
Temescal Creek – Reach 4	801.34	RARE, INTERMITTENT - AGR, GWR, REC1, REC2, WARM, WILD
Temescal Creek – Reach 5	801.35	AGR, GWR, REC1, REC2, WARM, WILD, RARE
Temescal Creek – Reach 6	801.35	INTERMITTENT - GWR, REC1, REC2, WARM, WILD
Coldwater Canyon Creek	801.32	MUN, AGR, GWR, REC1, REC2, WARM, WILD
Bedford Canyon Creek	801.32	INTERMITTENT - GWR, REC1, REC2, WARM, WILD
Dawson Canyon Creek	801.32	MUN, GWR, REC1, REC2, WARM, WILD
Day Creek	801.21	MUN,PROC, GWR, REC1, REC2, COLD, WILD
San Sevaine Creek	801.21	INTERMITTENT - MUN, GWR, REC1, REC2, COLD, WILD
San Timoteo Wash Reach 3	801.62	IGWR, REC1, REC2, WARM, WILD, RARE
Little San Gorgonio Creek & Tributaries	801.62, 801.63, 801.69	MUN, GWR, REC1, REC2, COLD, WILD
Sunnyslope Channel	801.27,	MUN, REC1, REC2, WARM, WILD, SPWN
Tequesquite Arroyo (Sycamore Creek)	801.27,	GWR, REC1, REC2, WARM, WILD, SPWN
Chino Basin/ Middle Santa Ana		
Chino Creek, Reach 1A	801.21	REC1, REC2, WARM, WILD, RARE
Chino Creek, Reach 1B	801.21	REC1, REC2, WARM, WILD, RARE
Mill Creek (Prado Area)	801.25	REC1, REC2, WARM, WILD, RARE
Cucamonga Creek – Reach 1	801.21	GWR, REC1, REC2, LWARM, WILD

Watershed Management Areas in Riverside County	Hydraulic Unit	Beneficial Uses
San Jacinto San Jacinto River reaches 1 and 6	802.31, 802.32 & 802.21	INTERMITTENT - MUN, AGR, GWR, REC1, REC2, WARM, WILD
San Jacinto San Jacinto River reaches 3-5	802.11, 802.14, 802.21,	INTERMITTENT - AGR, GWR, REC1, REC2, WARM, WILD
San Jacinto San Jacinto River reach 2 **See Canyon Lake**		
San Jacinto San Jacinto River reach 7	802.21	MUN, AGR, GWR, REC1, REC2, COLD, WILD
- Bautista Creek	802.21, 802.23	MUN, AGR, GWR, REC1, REC2, COLD, WILD
Strawberry Creek	802.21	MUN, AGR, GWR, REC1, REC2, COLD, WILD
Fuller Mill Creek	802.22	MUN, AGR, GWR, REC1, REC2, COLD, WILD
Stone Creek	802.21	MUN, AGR, GWR, REC1, REC2, COLD, W ILD
Salt Creek	802.12	INTERMITTENT - REC1, REC2, WARM, WILD
Logan, Black Mtn, Juaro Canyon, Indian, Hurkey, Poppet and Protrero Creeks, and other Tributaries to these Creeks	802.21, 802.22	INTERMITTENT - MUN, AGR, GWR, REC1, REC2, WARM, WILD
Lakes		
Lake Elsinore	802.31	REC1, REC2, WARM, WILD
Canyon Lake	802.11	MUN, AGR, GWR, REC1, REC2, WARM, WILD
Lake Hemet	802.22	MUN, AGR, GWR, POW, REC1, REC2, WARM, COLD, WILD, SPWN
Lake Fulmor	802.21	MUN, AGR, REC1, REC2, WARM, COLD, WILD
Lake Perris	802.11	MUN, AGR, IND, PROC, GWR, REC1, REC2, COMM, WARM, COLD, WILD
Lake Evans	801.27	REC1, REC2, WARM, COLD, WILD
Lake Mathews	801.33	MUN, AGR, IND, PROC, GWR, REC1, REC2, WARM, WILD, RARE
Lee Lake	801.34	AGR, IND, GWR, REC1, REC2, WARM, WILD
Mockingbird Reservoir	801.26	AGR, REC1, REC2, WARM, WILD

AGR: Agricultural Supply; MUN: Municipal and Domestic Supply; GWR: Groundwater Recharge; IND – Industrial Service Supply, POW – Hydropower generation, REC1: Water Contact Recreation; REC2: Non-Contact Water Recreation; WARM: Warm Freshwater Habitat; LWARM: Limited Warm Freshwater Habitat, COLD - Cold freshwater habitat, WILD: Wildlife Habitat, RARE – Rare threatened or endangered species. SPWN – Spawning, reproduction and development waters.

6. Urban Runoff is defined in the Glossary (Appendix 4). It includes those discharges from residential, commercial, industrial, and construction areas within the Permit Area and excludes discharges from Open Space[9], feedlots, dairies, farms and agricultural fields. Urban Runoff consists of storm water and "authorized non-storm water" (see Section VI) surface runoff from drainage sub-areas with various, often mixed, land uses within all of the hydrologic drainage areas that discharge into the Receiving Waters. In addition to Urban Runoff, the MS4 regulated by this Order receives flows from Open Space, agricultural activities, state and federal properties and other non-urban land uses not under the control of the Permittees. The quality of the discharges from the MS4 varies considerably and is affected by, among other things, past and present land use activities, basin hydrology, geography and geology, season, the frequency and duration of storm events, and the presence of past or present illegal and allowed disposal practices and Illicit Connections.

7. Pathogens (from sanitary sewer overflows, septic system leaks, and spills and leaks from portable toilets, pets, wildlife, and human activities) can impact water contact recreation and non-contact water recreation. Floatables (from trash) are an aesthetic nuisance and can be a substrate for algae and insect vectors. Oil and grease can coat birds and aquatic organisms, adversely affecting respiration and/or thermoregulation. Other petroleum hydrocarbon components may cause Toxicity to aquatic organisms and may impact human health. Suspended and settleable solids (from sediment, trash, and industrial activities) may be deleterious to benthic organisms and may cause anaerobic conditions to form. Sediments and other suspended particulates may cause turbidity, clog fish gills and interfere with respiration in aquatic fauna. They may also screen out light, hindering photosynthesis and normal aquatic plant growth and development. However, it is recognized that storm flows from non-urbanized areas such as national forest, state parks, wilderness, and agriculture, as shown on Appendix 1, naturally exhibit high levels of suspended solids due to climate, hydrology, geology and geography.[10] Toxic Substances from pesticides, petroleum products, metals, and industrial wastes can cause acute and/or chronic Toxicity, and can bioaccumulate in organisms to levels that may be harmful to human health. Nutrients (from fertilizer use, fire fighting chemicals, decaying plants, confined animal facilities, pets, and wildlife) may cause excessive algal blooms. These blooms may lead to problems with taste, odor, color and increased turbidity, and may depress the dissolved oxygen content, leading to fish kills.

---

[9] Only includes Open Space in strictly unurbanized areas. See Glossary definition of Urban Runoff.
[10] Riverside County Flood Control and Water Conservation District's "Hydrology Manual," dated April 1978 and page II-4 of "Santa Ana River, Design Memorandum No. 1, Phase II GDM on the Santa Ana River Mainstem, including Santiago Creek, Volume 2, Prado Dam." dated August 1988 and D.I. Inman & S.A. Jenkins "Climate Change and the Episodicity of Sediment Flux in Small California Rivers," Journal of Geology, Volume 107, pp. 251-270, 1999.

8. Bacteria and nutrients are the Pollutants of Concern for a majority of the inland waters that are listed under the 303(d) list of Impaired Waterbodies or an adopted Total Maximum Daily Load (TMDL). This Order requires the Permittees to identify sources of bacteria and nutrients in Urban Runoff to their MS4 and to control those Pollutant sources.

9. Recent information[11] shows that plastic wastes and materials released to surface water bodies can harm aquatic species by entanglement or ingestion. This Order requires the Permittees to consider facilities that handle nurdles[12] as a high priority site for inspection, and outreach. Nurdles are a major contributor to marine debris. During a three month study of Orange County researchers found them to be the most common beach contaminant[13]. Nurdles comprised roughly 98% of the beach debris collected in a 2001 Orange County study.

10. The Permittees' water quality monitoring data submitted to date document a number of exceedances of Water Quality Objectives for various Urban Runoff-related Pollutants (fecal coliform bacteria, nutrients, total suspended solids, turbidity, metals, etc.) at various watershed monitoring stations.

11. This Order includes requirements for control of Dry Weather flows from Permittee activities that may cause an exceedance of Water Quality Objectives in Receiving Waters for Total Dissolved Solids (TDS) or total inorganic nitrogen (TIN). Storm water was considered to be an insignificant source for nitrogen/TDS in groundwater.

12. The Permittees' 2003-2004, 2004-2005, 2005-2006, 2006-2007 and 2007-2008 Annual Reports indicate exceedances of Water Quality Objectives for each core MS4 monitoring station discussed in a through g, below. The Permittees have identified nutrients and bacteria as priority constituents for initial corrective actions.

    a. Corona Storm Drain (40) - Six samples were collected and analyzed for fecal coliforms. Three samples were collected in the Dry Season and three during Wet Weather events. All samples analyzed exceeded bacteria (as fecal coliform) Water Quality Objectives with a maximum value of 160,000 MPN fecal coliforms. Boron analyses exceeded Water Quality Objectives of 0.75 mg/L in

---

[11] http://www.bestlifeonline.com/cms/publish/health-fitness/Our_oceans_are_turning_into_plastic_are_we_2_printer.shtml, (alternative reference: http://rstb.royalsocietypublishing.org/search?fulltext=entanglement+and+ingestion&sortspec=date&submit=Submit&andorexactfulltext=phrase)

[12] A nurdle is a plastic pellet, also known as pre-production plastic pellet or plastic resin pellet.
[13] Moore, Charles (2002). "A comparison of neustonic plastic and zooplankton abundance in Southern California's coastal waters and elsewhere in the North Pacific". *Algalita Marine Research Foundation.* http://www.mindfully.org/Plastic/Ocean/Marine-Debris-Panel30oct02.htm.

one out of eighteen samples collected (0.78 mg/L). Six samples were collected and analyzed for Total Dissolved Solids (TDS) in 2003-2004. All samples were below the Temescal Creek and Santa Ana River Reach 3 Water Quality Objectives of 800 mg/L/700 mg/L TDS (respectively) and only one (11 mg/L) of ten samples (2005-2008) exceeded the 10 mg/L total nitrogen objective.

b. Sunnymead Channel (316) - Three samples were collected during Wet Weather events and analyzed for fecal coliforms in this time frame. All samples were greater than 5000 MPN and exceeded bacteria Water Quality Objectives of 200 or 400 MPN fecal coliforms. Two samples were collected during Wet Weather events and analyzed for TDS and were below the Water Quality Objective of 700 mg/L for Canyon Lake. Total nitrogen values in all ten samples collected during Wet Weather events were below the Water Quality Objective of 8 mg/L.

c. Hemet Channel (318) - All four Wet Weather samples were detected at greater than 7000 MPN and exceeded the bacteria Water Quality Objective of 200 or 400 MPN for fecal coliforms. As Salt Creek does not have numeric objectives for TDS, the Receiving Water for Salt Creek is Canyon Lake with an objective of 700 mg/L TDS. All eighteen samples collected during Wet Weather events and analyzed for TDS were below the Canyon Lake Water Quality Objective. Total nitrogen values in all nine samples collected during Wet Weather events were below the Water Quality Objective of 8 mg/L.

d. Magnolia Center (364) – Eleven out of thirteen samples (3-Wet Weather samples [>160000 MPN maximum concentration] and 10 dry [5000 MPN maximum]) collected exceeded the Water Quality Objective for fecal coliform (200 or 400 MPN MPN). Two (both collected during Wet Weather events) out of thirty-four samples identified total nitrogen concentrations in excess of the 10 mg/L Water Quality Objective. The maximum concentration measured was 13 mg/L. Water Quality Objective of 700 mg/L TDS were exceeded in three out of eight samples analyzed. The maximum TDS concentration was 930 mg/L TDS.

e. University Wash Channel (702) – All three samples were detected at greater than 5000 MPN concentration and exceeded the fecal coliform Water Quality Objectives of 200 or 400 MPN. The maximum concentration was 13,000 MPN. One (11 mg/L) out of sixteen samples analyzed for total nitrogen was above the Santa Ana River Reach 4 Water Quality Objective of 10 mg/L. Ten samples analyzed for TDS were below Water Quality Objective of 550 mg/L.

f. North Norco Channel (707) – Three out of four samples (>16000 MPN maximum) analyzed for fecal coliform exceeded bacteria Water Quality Objective of 200 or 400 MPN fecal coliform. Three (1300 mg/L maximum concentration dry, 900 mg/L wet) out of four samples analyzed for TDS were above the Santa Ana River-Reach 3 Water Quality Objective of 700 mg/L. Two

samples were Dry Weather and two samples were Wet Weather. One out of ten samples analyzed for total nitrogen exceeded the Water Quality Objective of 10 mg/L for total nitrogen.

g. Perris Line J Channel (752) – All four Wet Weather samples analyzed exceeded bacterial indicator Water Quality Objective the highest value was 13,000 MPN fecal coliform. Two of four samples analyzed for TDS exceeded the Water Quality Objective of 700 mg/L for Canyon Lake. One out of twelve samples analyzed exceeded the Water Quality Objective of 8 mg/L for total nitrogen.

13. The Permittees are participating in several studies in conjunction with the Storm Water Monitoring Coalition (SMC), Storm Water Quality Standards Task Force, the Lake Elsinore and Canyon Lake TMDL Task Force, the Middle Santa Ana River TMDL Task Force and Southern California Coastal Water Research Project (SCCWRP) to address the elevated fecal bacterial indicator levels. Also, the Permittees are anticipating that the use of fecal bacterial indicator will be changed to E. coli and the reclassification of REC uses for several MS4 facilities in the near future. However, E. coli data still indicates Water Quality Objective exceedances that will need to be addressed as part of the TMDL.

14. The above monitoring results, the 303(d) list of Impaired Waterbodies and the approved TMDLs indicate that bacterial contamination is one of the persistent problems in Urban Runoff. TMDL Implementation Plans including Urban Runoff Waste Load Allocations (WLAs) have been adopted by the Regional Board for the Middle Santa Ana River to address this problem. It should be noted, however, that the work of the Storm Water Quality Standards Task Force is likely to result in changes to Recreational Water Quality Objectives and implementation measures, including the suspension of recreational standards during high flow events. Further, some MS4 facilities may be recategorized as REC 2 or REC X (REC 1 nor REC 2) pursuant to Use Attainability Analyses (UAAs). These changes will likely allow the Permittees to focus their TMDL compliance resources on bacterial contamination that is affecting recreational swimming areas used during the Dry Season as the highest priority.

15. The Santa Ana River is the major Receiving Water in the Permit Area. During non-storm periods the flow in the River is dominated by effluent from POTW discharges. POTW discharges are regulated under NPDES permits issued by the Regional Board. In addition, the quality of the Santa Ana River within the Upper Santa Ana sub-watershed is greatly influenced by runoff from agricultural activities. Urban Runoff from the Permit Area constitutes a minor component of the Dry Weather flow in the Upper Santa Ana and San Jacinto sub-watersheds of the Santa Ana River. However, Urban Runoff may be more polluted than POTW discharges and therefore a more significant concern based on monitoring results identified in the Annual Reports.

F. CWA SECTION 303(D) LISTED WATERBODIES AND TMDLS (ALSO SEE SECTION K)

1. Water quality assessment conducted by Regional Board staff has identified a number of Beneficial Use Impairments due, in part, to Urban Runoff. Section 305(b) of the CWA requires the USEPA and each state that has been delegated NPDES permitting authority to routinely monitor and assess the quality of waters of their respective regions. If this assessment indicates that Beneficial Uses are not met, then that waterbody must be listed under Section 303(d) of the CWA as an Impaired Waterbody.
2. Based on the Regional Board's 2006[14] water quality assessment a number of water bodies within the Permit Area are listed (see Table 4, below) as Impaired pursuant to Section 303(d).

Table 4 - Impaired Waterbodies

Waterbody	Pollutant	Potential Sources	Proposed TMDL Completion
Santa Ana River, Reach 3,	Pathogens	Dairies	Approved 2007
Canyon Lake	Nutrients	Non-point Source	Approved 2005
	Pathogens	Non-point Source	Listing under evaluation
Lake Elsinore	Nutrients	Non-point Source	Approved 2005
	Unknown Toxicity PCBs	Unknown Unknown Non-point Source	2021 2019
Lake Fulmor	Pathogens	Unknown Non-point Source	2019
Santa Ana River, Reach 4	Pathogens	Non-point Source	2019

3. Federal regulations require that a total maximum daily load (TMDL) be established for each 303(d) listed waterbody for each of the Pollutants causing Impairment. The TMDL is the total amount of a Pollutant that can be discharged to a subject waterbody, while still enabling the waterbody to attain Water Quality Standards in

[14] On April 24, 2009, the Regional Board adopted Resolution No. R8-2009-0032 approving the CWA Section 305(b) Integrated Report/CWA Section 303(d) List of Impaired Waterbodies. Minor additional modifications were approved by the Regional Board on October 23, 2009. When the revised list is approved by the State Board and the USEPA, the 2006 list will be updated.

the receiving water. Attaining Water Quality Standards means that the receiving waterbody's Water Quality Objectives are met and its Beneficial Uses are protected. The TMDL is the sum of the individual WLAs for point source inputs, Load Allocations (LAs) for Non-Point Source inputs and natural background, and a margin of safety. The TMDLs are one of the bases for limitations established in Waste Discharge Requirements.

4. The Basin Plan amendment incorporating the Middle Santa Ana River Watershed Bacterial Indicator TMDLs (MSAR TMDL) was approved by the Regional Board on August 26, 2005 (Resolution No. R8-2005-0001), by the State Board on May 15, 2006, by the state's Office of Administrative Law on September 1, 2006, and by the USEPA on May 16, 2007.

5. The MSAR TMDL established limits for Bacterial source Indicators for Santa Ana River (Reach 3), Chino Creek (Reaches 1 and 2), Prado Park Lake, Mill Creek (Prado Area), and Cucamonga Creek (Reach 1). The MSAR TMDLs Implementation Plan identifies three sub-watersheds in Riverside County that drain to the Santa Ana River, Reach 3: 1) Riverside Watershed - Contributes surface drainage generally westward from the City of Riverside to the Santa Ana River; 2) Temescal Canyon watershed - Contributes surface drainage generally northward to Temescal Creek and then to the Santa Ana River; and 3) Chino Basin - The southeastern portion of the Chino Basin drains generally south to the Santa Ana River in Riverside County.

6. The MSAR TMDLs specifies WLAs for Urban Runoff, and discharges from concentrated animal feeding operations. LAs are specified for runoff from other types of agriculture and from natural sources (open space/undeveloped forest land). WLAs and LAs are specified for both Dry Season discharges and Wet Season discharges, with separate compliance dates. To protect REC1 Beneficial uses, the TMDL has WLAs for fecal coliform and *E. coli*. The Basin Plan currently does not have an established Water Quality Objective for *E. coli*. Stakeholders in the Santa Ana Region have formed the Storm Water Quality Standards Task Force (SWQSTF) to evaluate USEPA's bacterial indicator recommendations and appropriate recreational beneficial use designations for waterbodies throughout the Region. The SWQSTF is expected to make recommendations for the adoption of alternative bacterial indicators such as *E.coli,* based on USEPA's "Ambient Water Quality Criteria for Bacteria - 1986". These and other recommendations of the SWQSTF are likely to result in changes to recreational Water Quality Objectives.

7. The MSAR TMDL Implementation Plan assigns responsibilities to specific MS4 dischargers to identify sources of impairment, to propose BMPs to address those sources, and to monitor, evaluate, and revise BMPs as needed, based on the effectiveness of the BMP implementation program. These are generally considered as the short-term solutions. The MSAR Permittees are required to develop and

implement a long-term solution (a Comprehensive Bacteria Reduction Plan (CBRP)) designed to achieve compliance with the WLAs by the dates specified in the TMDLs. Specific Implementation Plan tasks are described in Chapter 5 of the Basin Plan and are assigned to one or more of the Permittees. Requirements of the TMDL Implementation Plan tasks are incorporated into this Order. A number of these Implementation Plan tasks are also jointly assigned to non-Permittee stakeholders. The stakeholders have established TMDL task forces to jointly implement and coordinate the TMDL Implementation Plan tasks.

8. The MSAR TMDL Task Force members are listed in Table 5.

Table 5 - Middle Santa Ana River Bacterial Indicator TMDL Task Force

MS4 Permittees	Non-MS4 Permittees
Corona, City of	Santa Ana Watershed Project Authority
Norco, City of	US Department of Agriculture, Forest Service
Riverside, City of	Ag Pool, Milk Producers Council
Riverside, County of	Region 4 MS4 Permittees - Claremont and Pomona (pending formal agreement)
RCFC&WCD	Regional Board
San Bernardino County Flood Control District (representing the County of San Bernardino and the municipalities named in the TMDL)[(San Bernardino County, and the Cities of Chino, Chino Hills, Fontana, Montclair, Ontario, Rancho Cucamonga, Rialto and Upland)]	

9. Pursuant to Task 3 of the MSAR TMDL, on June 29, 2007, the Regional Board approved the monitoring program (Resolution No. R8-2007-0046) proposed by the TMDL Task Force. Pursuant to Task 4 of the MSAR TMDL, on April 18, 2008, the Regional Board approved the Urban Source Evaluation Plan (USEP) that included a BMP effectiveness study (Resolution No. R8-2008-0044) proposed by the TMDL Task Force. This Order requires the Permittees on the Task Force to continue to implement the approved monitoring program and the USEP.

10. A BMP effectiveness study was completed as part of the MSAR Watershed–Wide and BMP effectiveness components of the Middle Santa Ana River Water Quality Monitoring Plan (dated April 3, 2008). The results of this study will be incorporated into a BMP selection criteria that will be used as a guide to address bacterial indicator sources within the MSAR watershed. The Principal Permittee plans to conduct a phase 2 study at its Low Impact Development (LID) testing facility to evaluate the effectiveness of several LID-based BMPs, which will further guide BMP selection in the MSAR watershed.

11. As part of Task 4.1, the MSAR Permittees completed the first phase of the approved USEP (Resolution No. R8-2008-0044) and the report is currently under review by Regional Board staff. Several discrete sources of bacterial indicator were identified, controlled, or eliminated as a result of this effort. Based on the outfall monitoring data collected to date, additional sites are identified, monitored and prioritized yearly for further evaluation in the next phases of the USEP. The next phase of the USEP that will focus on an implementation plan to retrofit BMPs to address elevated bacterial indicators from urban drainage areas flowing into Mill Creek and Cucamonga Creek in San Bernardino County is currently being evaluated.

12. Consistent with Task 4.3, this Order requires the Permittees to revise the DAMP to incorporate the results of the USEP and/or other studies. The DAMP revisions shall include schedules for meeting the bacterial indicator WLAs based on the schedule established in the MSAR TMDLs and the results of the USEP and/or other studies. These revisions shall also provide a proposal and schedule for 1) evaluating the effectiveness of BMPs and other control actions implemented and 2) evaluating compliance with the bacterial indicator WLAs for Urban Runoff by initiating a WLA pre-compliance evaluation monitoring program[15].

13. Pursuant to Task 4.5, the Permittees are required to revise the Water Quality Management Plan to incorporate BMPs as per the USEP, Task 4.1, for New Development and Significant Redevelopment Projects.

14. The Permittees are required to develop a CBRP to achieve compliance with the WLAs by the compliance dates. Periodic evaluation and update of the CBRP may be necessary based on a BMP effectiveness analysis to ensure compliance with the WLAs by the compliance dates.

15. Within the Permit Area, there are two watershed-wide MSAR TMDL monitoring stations (WW-S1 Santa Ana River Reach 3 at MWD Crossing and WW-S4 Santa Ana River Reach 3 at Pedley Avenue). The MSAR Permittees are required to comply with the numeric Bacterial Indicator targets at these monitoring locations by December 31, 2015 for the Dry Weather conditions (April 1 through October 31, as defined in the TMDL) and by December 31, 2025 for the Wet Weather conditions (November 1 through March 31, as defined by the TMDL).

16. In the absence of an approved CBRP, the WLAs become the final numeric WQBEL that must be achieved by the compliance dates.

---

[15] Pre-compliance evaluation monitoring is monitoring conducted prior to the TMDL compliance date to assess the effectiveness of BMPs implemented in reducing pollutant(s) of concern by the compliance date.

17. On December 20, 2004, the Regional Board adopted Resolution R8-2004-0037 amending the Basin Plan to incorporate the Lake Elsinore and Canyon Lake Nutrient TMDLs. These TMDLs were subsequently approved by the State Board on May 19, 2005, by the Office of Administrative Law on July 26, 2005 and by the USEPA on September 30, 2005. These TMDLs include urban WLAs that are now incorporated into Chapter 5 of the Basin Plan. For both Canyon Lake and Lake Elsinore, the TMDLs specify causal numeric targets (nitrogen and phosphorus) and response numeric targets (chlorophyll *a*, dissolved oxygen and un-ionized ammonia). The TMDLs also specify nitrogen and phosphorus WLAs (point source discharges) and LAs (nonpoint source discharges) for each lake. Compliance with interim dissolved oxygen and chlorophyll a numeric targets is to be achieved by December 31, 2015. Compliance with the final numeric targets and WLAs and LAs is to be achieved by December 31, 2020. The LAs and WLAs are specified as 10-year running average.

18. The nitrogen and phosphorus WLAs and LAs for Canyon Lake are applicable to those discharges tributary to Canyon Lake. The nitrogen and phosphorus WLAs and LAs for Lake Elsinore apply to those areas downstream of Canyon Lake and to overflows from Canyon Lake.

19. TMDL Implementation Plans for each TMDL assign responsibilities to specific MS4 dischargers/stakeholders to identify sources of Impairment, to propose BMPs to address those sources, and to monitor, evaluate and revise BMPs based on monitoring results. Specific TMDL Implementation Plan tasks associated with Urban Runoff are described in Chapter 5 of the Basin Plan and are assigned to one or more of the Permittees. Requirements of the TMDL implementation plan tasks are incorporated into this Order and were proposed for inclusion in Chapter 13 of the DAMP (see 2007 ROWD). Several of these tasks are also jointly assigned to non-Permittee stakeholders. The Permittees have established TMDL Task Forces to jointly implement and coordinate those tasks.

20. To evaluate compliance with TMDL WLAs as per the Implementation Plans, the Permittees proposed to submit a Comprehensive Nutrient Reduction Plan to:

    a. Evaluate the effectiveness of BMPs and other control actions implemented; and

    b. Evaluate the progress towards compliance with the nutrient WLA for Urban Runoff.

21. The Canyon Lake and Lake Elsinore Nutrient TMDL Task Force (also referred to as the San Jacinto Watershed Urban Dischargers) members are tabulated below:

Table 6 - Canyon Lake and Lake Elsinore Nutrient TMDL Task Force

Riverside MS4 Permittees	Non-Permittees
Beaumont, City of	California Department of Fish and Game
Canyon Lake, City of	California Department of Transportation (Caltrans),
Hemet, City of	Eastern Municipal Water District
Lake Elsinore, City of	Elsinore Valley Municipal Water District
Moreno Valley, City of	U.S. Air Force (March Air Reserve Base), March Joint Powers Authority,
Murrieta, City of	U.S. Forest Service
Perris, City of	Western Riverside County Agricultural Coalition
San Jacinto, City of	
Riverside, City of	
Riverside, County of	
RCFC&WCD	

22. The cities of Menifee and Wildomar were recently incorporated and are responsible for compliance with the Canyon Lake and Lake Elsinore Nutrient TMDL requirements. They have the option to participate in the TMDL Task Force or comply with the TMDL requirements on their own.

23. Interim compliance (compliance determination prior to the final WLA compliance dates) determination with the WLAs in the TMDLs will be based on the Lake Elsinore and Canyon Lake (LE/CL) Permittees progress towards implementing the various TMDL Implementation Plan tasks as per the resultant studies and plans approved by the Regional Board. The CL/LE Permittees are required to develop a Comprehensive Nutrient Reduction Plan (CNRP) designed to achieve compliance with the WLAs by the final compliance date for approval of the Regional Board. In the absence of an approved CNRP, the WLAs specified in the approved Canyon Lake/Lake Elsinore Nutrient TMDL will constitute the final numeric WQBELs.

G. NEW DEVELOPMENT/SIGNIFICANT REDEVELOPMENT – WQMP /LID

1. The California Constitution and Government Code provide the Co-Permittees planning policy powers that mandate that the Co-Permittees review and condition New Development consistent with the Subdivision Map Act, CEQA, and their respective general plans, ordinances, and resolutions to ensure the general public's health and safety. If these constitutional and statutory mandates are not properly implemented and local ordinances and resolutions are not properly enforced, there is a creditable potential that New Development could result in the discharge of Pollutants via Urban Runoff to the Waters of the U.S within the Permit Area.

2. Significant development has taken place in Riverside County in the last decade. These developments have resulted in the urbanization of many areas. Urbanization generally increases Urban Runoff volume and velocity of runoff and the amount of Pollutants in the runoff. As development occurs, natural vegetated

pervious ground cover is converted to impervious surfaces such as highways, streets, rooftops and parking lots. Natural vegetated soil can both absorb rainwater and remove Pollutants providing an effective natural purification process. In contrast, impervious surfaces can neither absorb water nor remove Pollutants, and the natural purification characteristics are lost. Additionally, urban development can significantly increase Pollutant loads as the increased population density causes proportionately higher levels of vehicle emissions, vehicle maintenance wastes, municipal sewage wastes, pesticide, household hazardous wastes, pet wastes, trash, and other Anthropogenic Pollutants.

3. Urbanization can especially threaten environmentally sensitive areas (ESAs) and stream geomorphology. ESAs typically have a much lower capacity to withstand Pollutant loads. In essence, development that is ordinarily insignificant in its impact on the environment may in a particular sensitive environment become significant. Designated ESAs are defined in the Glossary (Appendix 4).

4. Unmitigated high volumes and velocities of discharges from MS4 facilities associated with new development (which may include non-Urban Runoff) into natural watercourses can alter the natural rate of change of a stream and adversely impact aquatic ecosystems and stream habitat and cause stream bank erosion and physical modifications. These changes are the result of Hydromodification. Typically, Hydromodification especially impacts those natural streams in the developing foothills and in other urbanizing fringe portions of the Permit Area.

5. On October 5, 2000, the State Board adopted Order No. WQ-2000-11, which is a precedential order. Order No. WQ-2000-11 required that Urban Runoff generated by 85th percentile storm events from specific types of development categories be infiltrated, filtered or treated. The essential elements of this precedential order were incorporated into the 2002 MS4 Permit and are incorporated herein. In accordance with the requirements specified in the 2002 MS4 Permit, the Permittees developed a model WQMP and Template.

6. The WQMP and Template provide a framework to incorporate some of the watershed protection principles into the Co-Permittees' planning, construction and post-construction phases of New Development and Significant Redevelopment projects. The WQMP includes site design (including, where feasible, LID principles), Source Control and Treatment Control elements to reduce the discharge of Pollutants in Urban Runoff. On September 17, 2004, the Regional Board approved the WQMP. The Co-Permittees are requiring proponents of New Developments and Significant Redevelopments to develop and implement site-specific WQMPs. This Order requires Co-Permittees to continue requiring preliminary project-specific WQMPs as early as possible during the environmental review or planning phase (land use entitlement) and to review and approve final project-specific WQMP that is in substantial conformance with the preliminary

project-specific WQMP prior to the issuance of any building or grading permit. This Order also requires Co-Permittees to verify functionality of post-construction BMPs prior to issuance of certificate of occupancy and to track and ensure long term operation and maintenance of those BMPs as per the approved project-specific WQMPs.

7. An audit of each of the Pemittees' Urban Runoff management programs during the term of the 2002 MS4 Permit indicated no clear nexus between the watershed protection principles, including LID techniques specified in the WQMP and the Permittees' General Plan or related documents such as Development Standards, Zoning Codes, Conditions of Approval and Project Development Guidance. Existing procedures, ordinances, local codes, and development standards may be barriers to implementation of LID practices. This Order requires the Permittees to evaluate their General Plans, comprehensive or master plans, zoning codes, subdivision ordinances, project development standards, conditions of approval or related documents to determine whether the removal of any barriers, within their control, is feasible for implementation of LID techniques and other requirements of this Order. Where feasible, the Co-Permittees will make appropriate changes to remove barriers to implement LID techniques and other requirements of this Order.

8. This Order also requires the Permittees to review and enforce covenants, conditions and restrictions (CC&R) or develop other mechanisms to ensure proper long term operation and maintenance of post-construction BMPs.

9. In addition to addressing post-development water quality, the WQMP includes requirements to protect ESAs and address potential Hydromodification issues. Section 4.4 of the WQMP requires identification of Hydrologic Conditions of Concern (HCOC). An HCOC exists when a site's hydrologic regime is altered and there are significant impacts on downstream channels and aquatic habitats, alone or in conjunction with impacts of other projects. Currently, New Development and Significant Re-development projects are required to perform this assessment and incorporate appropriate BMPs to ensure existing hydrologic conditions are maintained. This Order requires the Permittees to implement LID techniques to minimize HCOC.

10. Management of the impacts of urbanization on water quality and stream stability in the Permit Area is more effective if the techniques are implemented at the project site, within the neighborhood and within each Co-Permittee's jurisdiction based on an overall watershed plan. The Permittees have identified Major Outfalls and have submitted maps of existing MS4 facilities. This Order requires the Permittees to expand upon the existing maps to include a map of its lined and unlined channels and streams within the Permit Area with the goal of identifying, prioritizing, and developing specific action plans for protecting those segments of streams that are vulnerable to development impacts.

11. This Order further requires the Permittees to develop a Watershed Action Plan that would address TMDL Implementation Plan BMP strategies and provide regional tools to address Hydromodification. The Permittees may choose to implement a single Watershed Action Plan for the entire Permit Area, or subdivide the Permit Area into sub-watersheds as appropriate to cost-effectively address TMDL requirements. The Watershed Action Plan integrates existing watershed based planning efforts and incorporates watershed tools to manage cumulative impacts of development on vulnerable streams, preserve structure and function of streams, and protect source, surface and groundwater quality and water supply in the permitted area. The Watershed Action Plan should integrate Hydromodification and water quality management strategies with land use planning policies, ordinances, and plans within each jurisdiction. Existing Permittee watershed planning efforts include the Western Riverside County Multiple Species Habitat Conservation Plan, Special Area Management Plan, Santa Ana and San Jacinto Integrated Regional Watershed Management Plans, Lake Elsinore and Canyon Lake and Middle Santa Ana River TMDL Task Forces, SCCWRP Hydromodification sensitivity mapping project, and various regional BMP evaluations being conducted by the Principal Permittee in conjunction with various water districts should be evaluated and incorporated into the Watershed Action Plan as necessary to address TMDL Implementation Plan requirements and Hydromodification. The regional efforts should be evaluated, and if necessary, enhanced to provide Permittees with the tools to integrate Hydromodification and TMDL management strategies with Permittee MS4 Permit compliance programs and land use planning policies, ordinances, and plans within appropriate Permittee jurisdictions within the Permit Area.

12. Pending completion of a Watershed Action Plan and implementing tools, management of the impacts of urbanization shall be accomplished on a per project and per jurisdiction basis through jurisdictional implementation of the watershed tools incorporated into the local general plans, ordinances and other requirements and the project-specific WQMPs.

13. The SMC in collaboration with SCCWRP and the California Storm Water Quality Association (CASQA) with funding from the State Water Resources Control Board and CASQA is developing a LID manual for Southern California. This manual will be incorporated into the CASQA BMP Handbooks. The Permittees are encouraged to utilize the LID manual as a resource to implement LID techniques once completed.

14. This Order requires the project proponents to first consider preventative and conservation techniques (e.g., preserve and protect natural features to the MEP) prior to considering mitigative techniques (Structural BMPs such as infiltration systems, or other Treatment Control BMPs). The mitigative measures should be

prioritized with the highest priority for BMPs that remove Pollutants in Urban Runoff and reduce the volume of Urban Runoff, such as infiltration, then other BMPs, such as harvesting and use, evapotranspiration and bio-treatment should be considered. Consistent with the MEP standard, these LID BMPs must be implemented at the project site. Consideration of "highest and best use" of the discharge should also be considered. For example, Lake Elsinore is evaporating faster than runoff from natural precipitation can recharge it. Requiring infiltration of 85% of runoff events for projects tributary to Lake Elsinore would only exacerbate current water quality problems associated with Pollutant concentration due to lake water evaporation. In cases where rainfall events have low potential to recharge Lake Elsinore (i.e. no hydraulic connection between groundwater to Lake Elsinore, or other factors), requiring infiltration of Urban Runoff from projects is counterproductive to the overall watershed goals. Project proponents, in these cases, would be allowed to discharge Urban Runoff, provided they used equally effective filtration-based BMPs. The Regional Board also recognizes that site conditions, including site soils, contaminant plumes, high groundwater levels, etc., could limit the applicability of infiltration and other LID BMPs at certain project sites. Where LID BMPs are not feasible or appropriate at the project site, more traditional, but equally effective BMPs (proprietary or non-proprietary) should be implemented. This Order provides for alternatives and in-lieu programs where preferred LID BMPs are infeasible or inappropriate. In addition, extra diligence should also be performed when proposing infiltration BMPs in areas where the proposed land use is often associated with soil and groundwater contamination. Pre-treatment of the water prior to infiltration is necessary in most cases. Proprietary treatment devices may be utilized when it is demonstrated that they meet or exceed the MEP standard.

15. The USEPA has determined that LID/green infrastructure can be a cost-effective and environmentally preferable approach for the control of storm water pollution and to minimize downstream impacts by mimicking pre-development hydrology. LID techniques promote the reduction of impervious areas which may achieve multiple environmental and economic benefits in addition to enhanced water quality and supply, stream and habitat protection, cleaner air, reduced urban temperature, increased energy efficiency and other community benefits such as aesthetics recreation, and wildlife areas. This Order incorporates a volume capture metric based on the design volume specified in the WQMP.

16. If not properly designed and maintained, Treatment Control BMPs could create a nuisance and/or habitat for vectors[16] (e.g., mosquitoes and rodents). The 2002 MS4 Permit required the Permittees to closely collaborate with the local vector

---

[16] Managing Mosquitoes in Storm water Treatment Devices, Marco E. Metzger, University of California Davis, Division of Agriculture and Natural Resources, Publication 8125.

control agencies during the development and implementation of such Treatment Control BMPs. The Permittees should continue these collaborative efforts with the vector control agencies to ensure that Treatment Control BMPs do not become a Nuisance or a potential source of Pollutants. The requirements specified in this Order include identification of responsible agencies for maintaining the Treatment Control BMPs and for providing funding for operation and maintenance.

17. If not properly designed and maintained, groundwater infiltration systems may adversely impact groundwater quality. Restrictions placed on Urban Runoff infiltration in this Order (Section XI.D.8) are based on recommendations provided by the USEPA Risk Reduction Laboratory. The Permittees should work closely with the water districts and water conservation districts to insure groundwater protection.

18. This Order incorporates new project categories and revised thresholds for several categories of new development and redevelopment projects that trigger the requirement for a WQMP. The 2008 National Research Council (NRC) report[17] indicates that roads and parking lots constitute as much as 70% of total impervious cover in ultra-urban landscape, and as much as 80% of the directly connected impervious cover. Roads tend to capture and export more storm water Pollutants than other impervious covers. As such, roads are included as a priority development category for which WQMPs are required. Private New Development and Significant Redevelopment projects incorporating roads typically allow road runoff to be addressed as part of the overall water quality strategy for the larger common plans of development. Permittee streets, roads and highways capital projects have special limitations. For example, the footprint of street, road and highway capital projects is often limited and may have hydraulic constraints due to lack of underground storm drain systems that would otherwise be necessary to hydraulically facilitate treatment of runoff. There are also limitations specified in state and federal design and code specifications that may limit or prohibit certain BMPs. Permittees may also be subject to flow diversion liability and limited road maintenance budgets and equipment. Street, road and highway projects that function as part of the MS4 also receive runoff and associated Pollutants from both existing urban areas and other external sources, including-adjacent land use activities, aerial deposition, brake pad and tire wear and other sources that may be outside the Co-Permittee's authority to regulate and/or economic or technological ability to control. These offsite flows can overwhelm Treatment Control BMPs designed to address the footprint (consistent with the typical requirements for a WQMP) of street, road or highway capital projects incorporating curb and gutter as part of its storm water conveyance function. Despite these limitations, the Regional Board finds that Permittee construction of streets, roads and highway capital

---

[17] National Research Council Report (2008), http://www.nap.edu/catalog.php?record_id=12465

projects may provide an opportunity to address Pollutant loads from existing urban areas. However, due to the nature of the facilities and projects, it would be unduly burdensome for the Co-Permittees to maintain WQMP documents for transportation projects (in addition to Facility Pollution Prevention Plans and other overlapping requirements of this Order). The Permittees are therefore not required to prepare WQMP documents for street, road and highway capital projects, but instead are required to develop functionally equivalent documents that include site specific consideration utilizing BMP guidance to address street, roads and highway capital project runoff to the MEP.

19. The NRC report also indicates that there is a direct relationship between impervious cover and the biological condition of downstream receiving waters. The Permittees are required to address HCOC from New Development and Significant Redevelopment projects to minimize downstream impacts.

H. CO-PERMITTEE INSPECTION PROGRAMS

1. Each Co-Permittee conducts inspections of those Construction Sites for which it has issued either a grading or building permit to determine compliance with its ordinances, regulations, and codes, including its Storm Water Ordinance. Each Co-Permittee, consistent with its ordinances, rules and regulations, inspects each site for compliance with the conditions of approval governing the grading or building permit. These inspections have been expanded by the Co-Permittees to determine that sites requiring coverage under the General Construction Activity Storm Water Permit have obtained permit coverage by verifying that a Waste Discharge Identification (WDID) number has been issued by the State Board..

2. The DAMP addresses compliance strategies with regard to industrial and commercial facilities. As part of their Urban Runoff management activities, the Principal Permittee and the County entered into an agreement, dated August 10, 1999 by which they have developed and funded, in cooperation with the Riverside County Environmental Health Department, the "Compliance Assistance Program" (CAP) which includes a storm water survey component as part of existing inspections of hazardous material handlers and retail food service activities. The CAP consists of educational outreach to the inspected facilities and detailed storm water compliance surveys for each facility that must secure a hazardous materials permit for either storing, handling or generating such materials (there are approximately 5,500 facilities of which approximately 2,300 are inspected annually, and all facilities are inspected at least once during a two year cycle) and retail food facilities (there are approximately 6,750 facilities, all of which are inspected 1 to 3 times annually). Storm Water Compliance Surveys are conducted with each inspection of hazardous materials facilities, and at least once during the MS4 Permit term for restaurants. Restaurant inspectors are authorized to conduct

additional surveys if they observe an IC/ID or ordinance violation. The type of industrial/commercial establishment that is inspected includes, but is not limited to, automobile mechanical repair, maintenance, fueling, or cleaning operation, automobile or other vehicle body repair or painting operations, and painting or coating operations. Completed surveys that indicate non-compliance are forwarded to the appropriate Co-Permittee's enforcement division for follow up action. In addition, the cities of Corona and Riverside, which operate publicly owned treatment works (POTW), conduct annually on average, approximately 4,400 wastewater pre-treatment inspections, on a variety of industrial and commercial establishments within their respective jurisdictions, including, but not limited to, retail food establishments, car washes, and carpet, drape & furniture cleaning establishments. The Permittees have agreed to notify Regional Board staff when conditions are observed during such inspections that appear to be in violation of either the Storm Water General Permits or a permit issued by the Regional Board.

3. An evaluation of the Permittees' inspection programs during the 2002 MS4 Permit indicated a wide range of compliance and non-compliance with the Construction Cite and Industrial and Commercial Facilities inspection requirements. In many instances, the Construction Site and Facilities' return to compliance was not properly documented. This Order includes requirements for a more effective inspection program and includes a performance measure, time to return to compliance, as a metric for program effectiveness.

I. ILLICIT CONNECTIONS/ ILLEGAL DISCHARGES (IC/ID)

1. Illegal Discharges to the MS4 can contribute to contamination of Urban Runoff and other surface waters. During the term of the 1990 MS4 Permit, the underground MS4 facilities were inspected and only one Illicit Connection was identified. Open channels and other aboveground elements of the MS4 are inspected for evidence of Illegal Discharges as an element of routine maintenance by the Permittees. The Permittees also developed a program to prohibit IC/IDs to their MS4 facilities. Continued surveillance and enforcement of these programs are required to eliminate IC/IDs. The Permittees have a number of procedures in place to eliminate IC/IDs to the MS4, including Construction Site and Commercial, and Industrial Facility inspections, MS4 facility inspections, water quality monitoring and reporting programs, and public education.

2. The Permittees have the authority to control Pollutants in Urban Runoff, to prohibit IC/ID, to control spills, and to require compliance and carry out inspections of the MS4 facilities within their respective jurisdictions. The Co-Permittees have been extended necessary legal authority through California

statutes and local charters. Consistent with this statutory authority, each of the Co-Permittees have adopted their respective Storm Water Ordinances.

3. Even though the Permittees have established the authority and the procedures to detect and eliminate IC/IDs, audits conducted during the term of the 2002 MS4 Permit indicated that this program element is generally carried out passively through complaint response. IC/IDs are also detected through inspection programs and maintenance activities. Reports from maintenance inspectors are also typically logged as complaints. This Order requires each Permittee to revise this program element based on the Center for Watershed Protection's Illegal Discharge Detection and Elimination: A Guidance Manual for Program Development and Technical Assessments, or equivalent program.

J. TECHNOLOGY-BASED EFFLUENT LIMITATIONS (Not Applicable)

K. WATER QUALITY-BASED EFFLUENT LIMITATIONS (WQBELs) AND TMDL WLA

1. 40 CFR 122.44(d) requires that NPDES permits include WQBELs to attain and maintain applicable numeric and narrative water quality criteria to protect the Beneficial Uses of the Receiving Water. Where numeric water quality criteria have not been established, 40 CFR 122.44(d) specifies that WQBELs may be established using USEPA criteria guidance under CWA section 304(a), proposed State criteria or a State policy interpreting narrative criteria supplemented with other relevant information, or an indicator parameter. In *Defenders of Wildlife, et al* v. *Browner,* No. 98–71080 (9th Cir, October 1999), the Court held that the CWA does not require strict compliance with State Water Quality Standards for MS4 permits under section 301(b)(1)(C), but that at the same time, the CWA does give the permitting authority the discretion to incorporate appropriate WQBEL under another provision, CWA Section 402(p)(3)(B)(iii). The use of BMPs to control or abate the discharge of Pollutants is allowed by 40 CFR 122.44(k)(3) when Numeric Effluent Limitations are infeasible or when practices are reasonably necessary to achieve Effluent Limitations and standards or to carry out the purposes and intent of the CWA. The legislative history and the preamble to the federal storm water regulations indicate that the Congress and the USEPA were aware of the difficulties in regulating Urban Runoff solely through traditional end-of-pipe treatment. It is the Regional Board's intent to require the Permittees to implement BMPs consistent with the MEP standard in order to support attainment of Water Quality Standards. This Order includes Receiving Water Limitations based on Water Quality Objectives; it prohibits the creation of Nuisance and requires the reduction of Water Quality Standards Impairment in Receiving Waters. The Permit includes a procedure for determining whether Urban Runoff is causing or contributing to exceedances of Receiving Water Limitations and for evaluating whether the DAMP must be revised to include additional or more effective BMPs designed to meet

Water Quality Standards. The Order establishes an iterative process to determine compliance with the Receiving Water Limitations.

2. To support attainment of Water Quality Standards, consistent with the MEP standards, this Order aims to reduce the discharge of Pollutants in Urban Runoff from the MS4 by requiring Permittees to:
   a. Implement BMPs at Permittee facilities and activities,
   b. Require BMPs, including where appropriate, LID techniques, to be implemented at New Development and Significant Redevelopment project sites prior to accepting discharges into their MS4 facilities, where feasible,
   c. Implement and annually evaluate the DAMP and each Permittee's LIP for effectiveness in reducing Pollutants in Urban Runoff, and
   d. Determine if Urban Runoff is contributing to exceedances of Water Quality Objectives or Beneficial Uses in Receiving Waters by comparing outfall and receiving water monitoring results to: (1) Water Quality Objectives (WQOs), (2) California Toxic Rule (CTR), (3) USEPA Multi-Sector Permit Parameter Benchmark Values and (4) other appropriate data identified by the Permittees. The Permittees should also evaluate the Regional Monitoring reports prepared by SCCWRP to assess trends in Urban Runoff and Receiving Water quality within the Permit Area.
3. Federal regulations (40 CFR 122.44(d)(1)(vii)(B) require inclusion of Effluent Limits that are "consistent with the assumptions and requirements of any available WLA for the discharge prepared by the State and approved by USEPA." Consistent with this requirement, this Order includes interim effluent limits and a process for developing a BMP-based approach which, if adopted by the Regional Board prior to the compliance dates(s) specified in the associated comprehensive plan, shall become the final WQBEL(s). The Permittees are required to submit a comprehensive plan describing the proposed BMPs and the documentation demonstrating that the BMPs are expected to attain the WLAs by the compliance dates when implemented. If the Regional Board approves this comprehensive plan, this Order will be amended to include the comprehensive plan as the final WQBEL(s). If the Regional Board does not approve the comprehensive plan prior to the compliance date; the WLAs will become the final WQBEL(s) on the applicable compliance date and will remain in effect until a comprehensive plan is approved by the Regional Board. The comprehensive plan will be updated, as necessary, to reflect evaluations of the effectiveness of the BMPs, including evaluations presented in the annual reports.

4. These WQBELs are consistent with the assumptions and requirements identified in the TMDL Implementation Plans adopted with the TMDLs because the WQBELs are expected to be sufficient to meet the WLAs by the compliance dates. The

TMDLs within the Permit Area are described in Section F, above. These include the following:

a. MSAR Bacterial Indicator TMDL

i. The TMDL relies on this Order to implement the WLAs for Urban Runoff from the MSAR Permittees.

ii. This Order requires the MSAR Permittees to fully comply with the TMDL Implementation Plan. The TMDL Implementation Plan includes requirements for monitoring, and submittal of plans and schedules to implement short term solutions and develop long-term solutions to achieve TMDL compliance by the specified compliance dates.

iii. There are two components in the MSAR TMDL (fecal coliform and *E. coli*). The Basin Plan currently does not have an established objective for *E. coli*. The work that is currently being done by SWQSTF is expected to make recommendations for the adoption of *E. coli* objectives and revised WLAs based on *E.coli*. This Order incorporates the current WLAs as WQBELs. If the WLAs are revised, this Order will be reopened to incorporate the new WLAs.

iv. Upon adoption of this Order, the tasks identified in the MSAR TMDL Implementation Plan that have been developed by the MSAR Permittees and approved by the Regional Board become the interim Effluent Limits.

v. The MSAR Permittees are required to develop a Comprehensive Bacteria Reduction Plan(CBRP) designed to achieve WLAs by the compliance date. Once approved by the Regional Board, the CBRP becomes the final Effluent Limit. In the absence of an approved CBRP, the WLAs become the final numeric WQBEL by the compliance date specified in the TMDL.

b. Canyon Lake and Lake Elsinore Nutrient TMDLs

i. This Order is consistent with the Urban WLAs specified in the Canyon Lake and Lake Elsinore Nutrient TMDLs.

ii. Consistent with the TMDL Implementation Plan, this Order requires the LE/CL Permittees to identify sources of Impairment, propose BMPs to address those sources, and to monitor, evaluate and revise BMPs based on the monitoring results. Specific TMDL Implementation Plan tasks are described in Chapter 5 of the Basin Plan and are assigned to one or more of

the Permittees. Requirements of the TMDL Implementation Plan tasks are incorporated into this Order and Chapter 13 of the 2007 DAMP.

iii. In Chapter 13 of the 2007 DAMP submitted with the ROWD, the LE/CL Permittees have proposed BMP programs, consistent with the aforementioned TMDL Implementation Plan tasks.

iv. This Order also requires the LE/CL Permittees to monitor at representative Urban Runoff monitoring locations defined in the Consolidated Program for Water Quality Monitoring (CMP), (Phase 2 TMDL Monitoring is specified in the Lake Elsinore and Canyon Lake Nutrient TMDL Monitoring Plan dated February 15, 2006) and TMDL Implementation Plan and to evaluate the effectiveness of BMPs implemented in the Permit Area in reducing Pollutants of Concern in Urban Runoff to determine progress towards attainment of WLAs by the specified compliance date.

v. The Regional Board recognizes that additional research is needed to determine the most appropriate control mechanism to attain Water Quality Standards for nutrients in these two lakes. This Order provides the LE/CL Permittees the flexibility to meet the WLAs through a variety of techniques. Even though, the WLAs for the Canyon Lake and Lake Elsinore Nutrient TMDLs are expressed as WQBELs, if Water Quality Standards in the Lakes are met through biological or other in-Lake control mechanisms, the LE/CL Permittees' obligation to meet the WLAs is satisfied. as the impairment for which the TMDLs were developed would not exist anymore. The Permittees in the affected watersheds are required to develop a CNRP designed to achieve the WLAs by the compliance dates specified in the TMDL. In the absence of an approved CNRP, the WLAs become the final numeric WQBELs for nutrients.

L. WATER QUALITY CONTROL PLAN (BASIN PLAN)

1. The Regional Board adopted a revised Water Quality Control Plan for the Santa Ana River Basin (hereinafter Basin Plan) that became effective on January 24, 1995. The Basin Plan designates Beneficial Uses, establishes Water Quality Objectives, and contains implementation programs and policies to achieve those Water Quality Objectives for all waters in the Santa Ana Region addressed through the Basin Plan.

2. More recently, the Basin Plan was significantly amended to incorporate revised boundaries for groundwater subbasins, now termed "management zones", new nitrate-nitrogen and TDS objectives for the new management zones, and new nitrogen and TDS management strategies applicable to both surface and ground

waters. This Basin Plan Amendment was adopted by the Regional Board on January 22, 2004. The State Board and the Office of Administrative Law (OAL) approved the amendment on September 30, 2004 and December 23, 2004, respectively. The USEPA approved the surface water standard and related provisions of the amendment on June 20, 2007.

3. TDS and TIN limitations in Table 4-1 of the Basin Plan are specified in this Order for Permittees' discharges subject to the De Minimus Permit. Where Dry Season flows are identified as part of the IC/ID program element, this Order also requires Permittees to establish their baseline discharge concentration for Dry Season conditions.

4. As discussed in Section K, WQBELs, and TMDL WLA, the Basin Plan has been amended to incorporate several TMDLs and TMDL Implementation Plans adopted for waterbodies within the Permit Area. In addition, the Basin Plan implements State Board Resolution 88-63, which established a state policy that all waters, with certain exceptions, are suitable or potentially suitable for municipal or domestic water supply. Thus, as discussed in detail in the Fact Sheet, Beneficial Uses recognized in the Basin Plan for Receiving Waters in the Permit Area are as follows:

   a. Municipal and Domestic Supply,
   b. Agricultural Supply,
   c. Industrial Service Supply,
   d. Industrial Process Supply,
   e. Groundwater Recharge,
   f. Hydropower Generation,
   g. Water Contact Recreation,
   h. Non-contact Water Recreation,
   i. Warm Freshwater Habitat,
   j. Limited Warm Freshwater Habitat,
   k. Cold Freshwater Habitat,
   l. Preservation of Biological Habitats of Special Significance,
   m. Wildlife Habitat,
   n. Rare, Threatened or Endangered Species, and
   o. Spawning, Reproduction, and Development

5. The existing and potential Beneficial Uses of groundwater that could be impaired by the discharge of Urban Runoff within the Permit Area include one or more of the following:

   a. Municipal and Domestic Supply,
   b. Agricultural Supply,
   c. Industrial Service Supply, and

d. Industrial Process Supply

6. The Basin Plan also incorporates by reference all State Board water quality control plans and policies including the 1990 Water Quality Control Plan for Ocean Waters of California (Ocean Plan) and the 1974 Water Quality Control Policy for Enclosed Bays and Estuaries of California (Enclosed Bays and Estuaries Policy). Water Quality Objectives specified in the Basin Plan are local numeric and narrative objectives that may be more stringent than the national or statewide water quality criteria.

M. NATIONAL TOXICS RULE (NTR) AND CALIFORNIA TOXICS RULE (CTR)

NTR and CTR are blanket water quality criteria that apply to all surface water discharges. However, the *Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California* states that the Policy does not apply to regulation of storm water discharges. Regional Board believes that compliance with Water Quality Standards through implementation of BMPs is appropriate for regulating Urban Runoff. The USEPA articulated this position on the use of BMPs in storm water permits in the policy memorandum entitled, "Interim Permitting Approach for Water Quality-Based Effluent Limitations in Storm Water Permits" (61 FR 43761, August 9, 1996).[18]

N. STATE IMPLEMENTATION POLICY (SIP)

See Section M, above.

O. COMPLIANCE SCHEDULES AND INTERIM REQUIREMENTS

The Basin Plan contains schedules for achieving compliance with WLAs for Bacterial Indicators in the MSAR watershed and nutrients in the San Jacinto watershed (Canyon Lake/Lake Elsinore). It is appropriate to require the CL/LE Permittees to comply with those time schedules for various deliverables as specified in the approved TMDL Implementation Plans. Consistent with the State Board's Compliance Schedule Policy (Resolution No. 2008-0025), this Order incorporates interim and final Effluent Limits, where applicable. Additionally, since the TMDL compliance dates are outside the term of this MS4 Permit, it is also appropriate to require the Permittees to monitor and report the effectiveness of BMPs implemented in the Permit Area to evaluate progress towards attainment of WLAs by the time schedules specified in the adopted TMDLs. This Order includes the schedules for deliverables as part of the TMDL Implementation Plans as well as a requirement to monitor the effectiveness of BMPs in the Permit

---

[18] See discussions on Wet Weather Flows in the Federal Register/Vol. 65, No. 97/Thursday, May 18, 2000/Rules and Regulations

Area in reducing Pollutant discharges and to report progress towards compliance with the TMDL WLAs by the compliance dates.

P. ANTIDEGRADATION POLICY

40 CFR 131.12 requires that State Water Quality Standards include an antidegradation policy consistent with the federal policy. The State Board established California's antidegradation policy in Resolution No. 68-16. Resolution No. 68-16 incorporates the federal antidegradation policy where the federal policy applies under federal law. Resolution No. 68-16 requires that existing quality of waters be maintained unless degradation is justified based on specific findings. The Regional Board's Basin Plan implements, and incorporates by reference, both the State and federal antidegradation policies. As discussed in detail in the Fact Sheet (see sections IV and V), the permitted discharges are consistent with the antidegradation provisions of 40 CFR 131.12 and State Board Resolution No. 68-16.

Q. ANTI-BACKSLIDING

Sections 402(o)(2) and 303(d)(4) of the CWA and federal regulations at 40 CFR 122.44(l) prohibit backsliding in NPDES permits. These anti-backsliding provisions require Effluent Limitations in a reissued NPDES permit to be as stringent as those in the previous permit, with some exceptions where Effluent Limitations may be relaxed. All Effluent Limitations in this Order are at least as stringent as the Effluent Limitations in the 2002 Order.

R. PUBLIC EDUCATION/PARTICIPATION

1. Public participation during the development of Urban Runoff management programs and implementation plans is necessary to ensure that all stakeholder interests and a variety of creative solutions are considered. In addition, the federal storm water regulations require public participation in the development and implementation of the Urban Runoff management program. As such, the Permittees are required to solicit and consider all comments received from the public and submit copies of the comments to the Executive Officer of the Regional Board with the Annual Reports. In response to public comments, the Permittees may modify reports, plans, or schedules prior to submittal to the Executive Officer.

2. There are Pollutants in Urban Runoff from privately owned and operated facilities such as residences, businesses and commercial establishments and public and private institutions. A successful NPDES MS4 permit program should include the participation and cooperation of public entities, private businesses, and public and private institutions. Therefore, public education is a critical element of the DAMP. As the population increases in the Permit Area, it will be even more important to

continue to educate the public regarding the impact of human activities on the quality of Urban Runoff.

3. In addition to the Regional Board, a number of other stakeholders are involved in the management of the water resources of the Region. These include, but are not limited to, the incorporated cities in the Region, POTWs, the three counties, and the Santa Ana Watershed Project Authority and its member agencies. The entities listed in Appendix 2 are considered as potential dischargers of Urban Runoff in the Permit Area. It is expected that these entities will also work cooperatively with the Permittees to manage Urban Runoff. The Regional Board, pursuant to 40 CFR 122.26(a), has the discretion and authority to require non-cooperating entities to participate in this Order or to issue individual MS4 permits. The Permittees may request the Regional Board to issue a separate NPDES Permit to any discharger into MS4 facilities they own or operate.

4. Cooperation and coordination among the stakeholders (regulators, Permittees, the public, and other entities) are critical to optimize the use of finite public resources and ensure economical management of water quality in the Region. Recognizing this fact, this Order focuses on integrated watershed management and seeks to integrate the programs of the stakeholders, especially the holders of the three MS4 permits within the Regional Board's jurisdiction.

5. Education is an important aspect of every effective Urban Runoff management program and the basis for changes in behavior at a societal level. Education of municipal planning, inspection, and maintenance department staff is especially critical to ensure that in-house staff understand how their activities impact water quality, how to accomplish their jobs while protecting water quality, and their specific roles and responsibilities for compliance with this Order. Public education, designed to target various urban land users and other audiences, is also essential to inform the public of how individual actions affect Receiving Water quality and how adverse effects can be minimized.

6. Some Urban Runoff issues, such as public education and training, can be effectively addressed on a regional or statewide basis. Regional approaches to Urban Runoff management can improve program consistency and promote sharing of resources, which can result in implementation of more efficient programs. In particular the counties of San Bernardino and Riverside and their collective municipalities are encouraged to cooperatively work together and generate a unified education and training program.

S. PERMITTEE FACILITIES AND ACTIVITIES

1. The Permittees own/operate facilities where industrial or related activities take place that may have an impact on Urban Runoff quality. Some of the Permittees

enter into contracts with outside parties to carry out activities that may also have an impact on Urban Runoff quality. These facilities and related activities include, but are not limited to, street sweeping, catch basin cleaning, maintenance yards, vehicle and equipment maintenance areas, waste transfer stations, corporation and storage yards, parks and recreational facilities, landscape and swimming pool maintenance activities, MS4 maintenance activities and the application of herbicides, algaecides and pesticides.

2. This Order requires continued implementation of BMPs intended to reduce Pollutant discharges from those Permittee activities/facilities that are found to be significant sources of Pollutants in Urban Runoff. This Order prohibits non-storm water discharges from facilities owned or operated by the Permittees unless the discharges are exempt under Section VI of this Order or are permitted by the Regional Board under an individual NPDES permit.

3. Program evaluations conducted during the term of the 2002 MS4 Permit indicated varying degrees of compliance/noncompliance at Permittee facilities and activities. This Order requires each Permittee to review its inventory of fixed facilities, field operations and drainage facilities to ensure that Permittee facilities do not cause or contribute to a Pollution or Nuisance in Receiving Waters. Permittee fixed public facilities and field operations are to be inspected annually.

T. MUNICIPAL CONSTRUCTION PROJECTS

1. The 2002 MS4 Permit authorized the discharge of storm water from construction activities on an acre or more, that are under ownership or direct responsibility of the Permittees. Permittees were required to notify the Regional Board prior to commencement of construction activities, and to comply with the latest Statewide General Construction Permit. Permittees were also required to develop a SWPPP and monitoring program specific to the Construction Site. Program evaluations conducted during the term of the 2002 MS4 Permit indicated that some Permittees were not submitting or were not aware of the requirement to submit a NOI and subsequent Notice of Termination (NOT) for Permittee Construction Sites. This Order continues the notification requirement.

2. This Order builds upon the requirement of the 2002 MS4 Permit by requiring Permittees to include post-construction BMP information for Permittee Construction Sites meeting WQMP and General Construction Permit criteria along with the NOT submitted to the Executive Officer upon completion of the construction activity. The NOT must include photographs of the completed project, a site map including structural post-construction BMP locations, long term operation and maintenance responsibility information, field verification report and copies of the final field verification reports required under Section XII.I. Permittees are required to develop

a database of post-construction BMPs per Section XII.K.4. for which they are responsible and reference this database in the LIPs.

3. Emergency Permittee public works projects required to protect public health and safety are exempted from these requirements, until the emergency ends, at which time they need to comply with the requirements.

U. MONITORING AND REPORTING

1. 40 CFR 122.48 requires that all NPDES permits specify requirements for monitoring and reporting. Sections 13267 and 13383 of the CWC authorize the Regional Board to require technical and monitoring reports. The Monitoring and Reporting Program, Attachment 3, establishes monitoring and reporting requirements to implement federal and State requirements.

2. An effective monitoring program characterizes Urban Runoff, identifies problem areas, and determines the impact of Urban Runoff on receiving waters and the effectiveness of BMPs. The Principal Permittee administers the CMP for the Permittees. The CMP includes Wet and Dry Season monitoring of MS4 Outfalls and Receiving Waters throughout Riverside County.

3. The Regional Board recognizes the importance of watershed management efforts and regional planning and coordination in the development and implementation of programs and policies related to Receiving Water quality protection, including the Urban Runoff program and TMDL processes. In light of recent TMDLs that have been developed and the expectation of future TMDLs, this Order allows the Permittees to develop a Coordinated Watershed Monitoring Plan that shows the nexus among various Urban Runoff related monitoring programs that the Permittees are participating and the MS4 permit requirements including but not limited to WLA pre-compliance, BMP effectiveness, urban source and trend evaluation, Receiving Water quality and Hydromodification effects monitoring as part of the requirements of the Monitoring and Reporting Program.

4. Multiple entities, such as POTWs, MS4, CAFOs, and other permitted and non-permitted dischargers, discharge into the same water bodies. The discharges from these various sources could potentially affect the water quality of these water bodies even when these dischargers are complying with their discharge permits. Monitoring the Receiving Waters where these multiple types of discharges take place is necessary to determine these water bodies' compliance with Water Quality Objectives and their attainment of Beneficial Uses.

5. In the past, multiple entities have individually monitored the water bodies receiving their discharges to determine impacts to these waters from their discharges. The

monitoring has resulted in fragmented data that is inconsistent in quality, and that has potentially resulted in duplication of resources.

6. The SMC's "Model Monitoring Program for Municipal Separate Storm Sewer Systems in Southern California", August 2004 Technical Report #419 indicated that "...the lack of mass emissions stations in the inland counties hampers their ability to estimate the proportional contribution of these inland areas to cumulative loads downstream." The SMC consists of representatives from the Counties of Ventura, Los Angeles, Orange, San Bernardino, Riverside, and San Diego and the City of Long Beach. Consistent with this coordinated effort, this Order includes requirements for mass emissions monitoring.
7. Every two years, the Regional Board will assess readily available data to determine if the water bodies within its jurisdiction comply with the Water Quality Objectives and attain the assigned Beneficial Uses. The data reviewed for the assessment comes from sources such as municipalities, POTWs, individual public submittals, TMDL monitoring, and special studies. The data necessary for the assessment is of known and documented quality and generated under the auspices of a Quality Assurance Project Plan (QAPP). The data also is required to be statistically sufficient to assess if the water body is meeting Water Quality Objectives and to determine if water quality is declining over time.
8. A coordinated monitoring effort is needed for each sub-watershed in the Santa Ana Region that will provide statistically sufficient data. These data should be collected with appropriate quality control and quality assurance programs and should be made available in an electronic format to meet assessment objectives.
9. The Regional Board has identified sub-watersheds in the Santa Ana Region where potential duplication of effort is taking place. These sub-watersheds include: the Upper Santa Ana River watershed, MSAR watershed, Lower Santa Ana River watershed, and the San Jacinto River watershed.
10. Regional Board staff proposes to require the various entities discharging into the waterbodies in these sub-watersheds to coordinate monitoring efforts, prepare, submit for approval, and implement a watershed monitoring plan; a QAPP, and a data management, validation, verification mechanism in order to meet the assessment objectives.
11. Under the direction of the MS4 permittees, SCCWRP is coordinating a watershed monitoring effort in Southern California. The Santa Ana Region is included in their monitoring effort. This effort will potentially produce data that will meet the needs of the Regional Board in assessing water quality. This Order requires the Permittees to continue their participation in this regional effort.

V. STANDARD AND SPECIAL PROVISIONS

The dischargers must comply with all standard provisions and with those additional conditions that are applicable under Federal NPDES Regulations 40 CFR122.41 and 40 CFR 122.42.

W. NOTIFICATION OF INTERESTED PARTIES

The Regional Board has notified the dischargers and interested agencies and persons of its intent to prescribe WDRs for the discharge and has provided them with an opportunity to submit their written comments and recommendations. Details of notification are provided in the Fact Sheet for this Order.

X. CONSIDERATION OF PUBLIC COMMENT

The Regional Board has notified the Permittees, all known interested parties, and the public of its intent to issue WDRs for this discharge and has provided them with an opportunity to submit their written views and recommendations.

The Regional Board, in a public meeting, heard and considered all comments pertaining to the discharge and the requirements of this Order. Details of the Public Hearing are provided in the Fact Sheet for this Order.

Y. ALASKA RULE

On March 30, 2000, USEPA revised its regulation that specifies when new and revised State and Tribal Water Quality Standards become effective for CWA purposes (40 CFR 131.21, 65 FR 24641, April 27, 2000). Under the revised regulation (also known as the Alaska rule), USEPA must approve new and revised Water Quality Standards submitted to USEPA after May 30, 2000 before being used for CWA purposes. The final rule also provides that standards already in effect and submitted to USEPA by May 30, 2000 may be used for CWA purposes, whether or not approved by USEPA.

Z. COMPLIANCE WITH CZARA

The Coastal Zone Act Reauthorization Amendments of 1990 (CZARA), Section 6217(g), requires coastal states with approved coastal zone management programs to address Non-Point Source Pollution impacting or threatening coastal water quality. The CZARA addresses five sources of non-point pollution: agriculture, silviculture, urban, marinas, and Hydromodification. This Order addresses the management measures required for the urban category. Compliance with requirements specified in this Order relieves the Permittees for developing a Non-Point Source Plan, for the urban category, under CZARA.

AA. NON-POINT SOURCE DISCHARGES

Consistent with the State Board's 2004 "Policy for the Implementation and

Enforcement of the Nonpoint Source Pollution Control Program," the Regional Board may issue WDRs for Non-Point Source (NPS) Pollutant discharges, such as agricultural irrigation runoff or return flows that are not subject to NPDES requirements, if identified as a significant source of Pollutants. In addition, if the water quality significance of Non-Point Source discharges is not clearly understood, the Regional Board may issue conditional waivers of WDRs to Non-Point Source dischargers, and require monitoring to gather the information necessary to effectively manage these discharges.

BB. STRINGENCY REQUIREMENTS FOR INDIVIDUAL POLLUTANTS. (N/A)

CC. FISCAL RESOURCES

California is experiencing a fiscal crisis unprecedented since the Great Depression. The November 2009 unemployment rate is 12.2 percent in California and 14.7 percent in Riverside County.[19] The seasonally adjusted national unemployment rate in November 2009 is at a 26-year high of 10.2 percent. The Federal Reserve projected that the national unemployment rate, currently at a 26-year high of 9.4 percent, will pass 10 percent by the end of the year. Most federal policymakers said it could take "five or six years" for the economy and the labor market to get back on a path of long-term health.[20] State and local governments are experiencing significant budgetary shortfalls and are reducing staffing and programs across the board. Given this economic environment, priority will be given to preserving the most essential elements of existing Urban Runoff programs and identifying and implementing strategies to improve the efficiency of existing programs in protecting Receiving Waters.

Intentionally Blank

---

[19] Employment Development Department, State of California, December 18, 2009. http://www.calmis.ca.gov/file/lfmonth/rive$pds.pdf
[20] http://www.msnbc.msn.com/id/31963779/ns/business-stocks_and_economy/

PERMIT REQUIREMENTS:

IT IS HEREBY ORDERED that the Riverside County Flood Control and Water Conservation District, the County of Riverside, and the incorporated cities of Beaumont, Calimesa, Canyon Lake, Corona, Hemet, Lake Elsinore, Menifee, Moreno Valley, Murrieta, Norco, Perris, Riverside, San Jacinto, and Wildomar, in order to meet the provisions contained in Division 7 of the Water Code and regulations adopted thereunder, and the provisions of the CWA, as amended, and the regulations and guidelines adopted there under, must comply with the following:

III. PERMITTEE RESPONSIBILITIES:

A. RESPONSIBILITIES OF THE PRINCIPAL PERMITTEE:

1. The Principal Permittee shall be responsible for managing the overall Urban Runoff program and shall:

   a. Coordinate revisions to the DAMP.

   b. Implement area-wide management programs, monitoring and reporting programs, and related plans as required by this Order.

   c. Coordinate chemical and biological water quality monitoring and any other monitoring as required by the Executive Officer.

   d. Prepare, coordinate the preparation of, and submit to the Executive Officer, those reports and programs necessary to comply with this Order.

   e. Provide staff support to the Management Steering Committee (Appendix 4, Glossary) to address Urban Runoff management policies for the Permit Area and coordinate the review, and necessary revisions to the DAMP and Implementation Agreement. The Management Steering Committee will continue to meet consistent with the requirements of Section XVII.D of this Order.

   f. Coordinate and conduct Technical Committee (Appendix 4) meetings consistent with the requirements of Section XVII.D of this Order. The Technical Committee will continue to direct the development of the DAMP and coordinate the implementation of the overall Urban Runoff program.

   g. Take the lead role in initiating and developing area-wide programs and activities necessary to comply with this Order.

h. Coordinate activities and participate in committees/subcommittees formed to comply with this Order.

i. Coordinate the implementation of this Order with the Regional Board and Co-Permittees, including the submittal of joint reports, plans, and programs as required under this Order.

j. Provide technical and administrative support to the Co-Permittees, including informing them of the status of known pertinent municipal programs, pilot projects, and research studies.

k. Coordinate with the Co-Permittees the implementation and necessary updates to Urban Runoff quality management programs, monitoring and reporting programs, implementation plans, public education, other Pollution Prevention measures, household Hazardous Waste collection, and BMPs outlined in the DAMP and take other actions consistent with the MEP standard.

l. Gather and disseminate information on the status of statewide Urban Runoff programs and evaluate the information for potential use in the execution of this Order. Hold workshops focused on Urban Runoff regulatory requirements, BMPs, and other related topics.

m. Compile information provided by the Co-Permittees and determine the effectiveness of the overall Urban Runoff program in attaining Receiving Water Quality Standards. This determination must include a comparative analysis of monitoring data to the applicable Water Quality Objectives for Receiving Waters as specified in Chapter 4 of the Basin Plan.

n. Solicit and coordinate public input for major changes to the Urban Runoff management programs and the implementation thereof.

o. Coordinate the development and implementation of procedures and performance standards, to assist in the consistent implementation of BMPs consistent with the MEP standard, as well as Urban Runoff management programs, among the Co-Permittees.

p. Participate in watershed management programs and regional and/or statewide monitoring and reporting programs.

q. In collaboration with the Co-Permittees, other MS4 Programs and/or CASQA, develop guidelines for defining expertise and competencies of storm water program managers and inspectors and develop and submit for approval a training program for various positions in accordance with these guidelines and Section XV of this Order.

r. Within 6 months of adoption of this Order, the Principal Permittee shall develop a library of BMP performance reports, and revise the library annually thereafter. At a minimum, obsolete performance reports should be removed and updated reports from the Permittees, CalTrans, CASQA, American Society of Civil Engineers or other appropriate sources that include more effective and proven BMPs should be added. The library may use national, statewide or regional reports. The purpose of this library is to facilitate the Permittees approval of BMPs, review and approval of WQMPs, etc.

s. Within 6 months of adoption of this Order, the Principal Permittee shall coordinate a review of the DAMP with the Co-Permittees to determine the need for update or revisions to ensure compliance with the requirements of this Order and establish a schedule for those revisions.

2. The activities of the Principal Permittee shall also include, but not be limited to, the following for MS4 owned or operated by the Principal Permittee:

   a. To cause appropriate enforcement actions as necessary against IC/IDs to its MS4 to ensure compliance with Urban Runoff management programs, ordinances and implementation plans, including physical removal of Illicit Connections and prohibition of Illegal Discharges.

   b. Ensure that applicants for encroachment permits for permanent connection to its MS4 facilities are notified in writing of their obligations to comply with Storm Water Ordinances, WQMP, and General Stormwater Permit requirements. The Principal Permittee shall make sure that encroachment activities within the limits of its rights-of-way comply with the General Construction Permit post construction standards. An encroachment project with a WQMP reviewed and approved by the Co-Permittee with jurisdictional authority may constitute compliance with the General Construction Permit post construction standards[21].

   c. Conduct inspections and maintain the MS4 facilities over which it has jurisdiction.

   d. Review and revise, if necessary, those agreements to which it is a party and those regulations and policies it deems necessary to provide adequate legal authority to maintain the MS4 facilities for which it has jurisdiction and to take those actions required of it by this Order and the federal Storm Water Regulations (see Section VIII);

---

[21] The State General Construction Permit Order No. 2009-0009-DWQ, Section XII

e. Monitor, document, and report that appropriate enforcement actions against Illegal Discharges to the MS4 facilities for which it has jurisdiction are taken and pursued as necessary to ensure compliance with Urban Runoff management programs, implementation plans, and regulations and policies, including physical elimination of IC/IDs (see Section IX);

f. Continue to respond or cause the appropriate entity or agency to respond to emergency situations such as accidental spills, leaks, and IC/IDs to prevent or reduce the discharge of Pollutants to its MS4 facilities and to the Receiving Waters (see Section XVI).

g. Track, monitor, and keep training records of all personnel involved in the implementation of the Principal Permittee's Urban Runoff management program.

B. RESPONSIBILITIES OF THE CO-PERMITTEES:

1. Each Co-Permittee shall complete a LIP, in conformance with Section IV of this Order and the approved LIP template.

2. Each Co-Permittee shall be responsible for managing the Urban Runoff program within its jurisdiction and shall:

   a. Maintain adequate legal authority to control the contribution of Pollutants to the MS4 and enforce those authorities.

   b. Conduct inspections of and maintain its MS4 facilities in accordance with the criteria developed pursuant to Section XIV.

   c. Continue to implement management programs, monitoring and reporting programs, appropriate BMPs listed in the DAMP and LIP, and related plans as required by this Order and take such other actions consistent with the MEP standard.

   d. Continue to seek sufficient funding for the area-wide Urban Runoff management plan, local Urban Runoff program management, Urban Runoff enforcement, public outreach and education activities and other Urban Runoff related program implementation.

   e. Continue to coordinate with other public agencies as appropriate, to facilitate the implementation of this Order and the DAMP/LIP.

   f. Ensure that applicants for encroachment permits for permanent connection to Permittee MS4 facilities are notified of their obligations to comply with Storm

Water Ordinances, WQMP, and the State General Construction Permit post construction standards. The Permittees shall enforce their Storm Water Ordinances to the extent of their legal authority. An encroachment project with a WQMP reviewed and approved by the Co-Permittee who owns the MS4 may constitute compliance with the General Construction Permit post construction standards[22].

g. Maintain up-to-date MS4 facility maps. Annually review these maps and if necessary, submit revised maps to the Principal Permittee with the information required for preparation of the Annual Report.

h. Prepare and submit to the Principal Permittee in a timely manner specific reports/information, related to the Co-Permittees' Urban Runoff management program, necessary to develop an Annual Report for submittal to the Executive Officer.

3. The Co-Permittees' activities shall include, but not be limited to, the following:

a. Participate in the Management Steering Committee and the Technical Committee meetings consistent with the requirements of Section XVII.D of this Order.

b. Conduct and coordinate with the Principal Permittee surveys and monitoring needed to identify Pollutant sources and drainage area characteristics within its jurisdiction. Where an Illegal Discharge crosses jurisdictional boundaries, to the extent feasible coordinate with neighboring jurisdictions to locate and end the Illegal Discharge.

c. Prepare and submit reports to the Principal Permittee to facilitate compilation of joint reports to the Regional Board in compliance with submittal deadlines.

d. Participate in the development and implementation of plans, strategies, management programs, monitoring and reporting programs that are proposed by the Principal Permittee, Technical Committee, or the Management Steering Committee to comply with this Order.

e. Participate in subcommittees formed by the Principal Permittee, Technical Committee, or the Management Steering Committee to comply with this Order.

---

[22] The State General Construction Permit Section XIII

f. Respond to or arrange for the appropriate entity or agency to respond to Emergency Situations such as accidental spills, leaks, IC/IDs, etc., to prevent or reduce the discharge of Pollutants to their MS4 facilities and the Receiving Waters.

g. Continue to pursue enforcement actions as necessary within its jurisdiction for violations of Storm Water Ordinances, and other elements of its Urban Runoff management program.

C. IMPLEMENTATION AGREEMENT

The Permittees shall allow any cities that were not signatories to the original Implementation Agreement but have been subsequently added to this Order to participate in the Implementation Agreement. The Permittees must annually review their Implementation Agreement and determine the need, if any, for additional revision. Beginning with the first Annual Report after adoption of this Order the Permittees must include the findings of this review and a schedule for any necessary revision(s) to the Implementation Agreement, if any. A copy of the signature page and any revisions to the Agreement shall be included in the Annual Report.

IV. LOCAL IMPLEMENTATION PLAN:

A. Within 6 months of adoption of this Order, the Permittees shall develop and submit for approval of the Executive Officer a LIP template. The LIP template shall be amended as the provisions of the DAMP are amended to address the requirements of this Order. The LIP template shall facilitate a description of the Co-Permittee's individual programs to implement the DAMP, including the organizational units responsible for implementation and identify positions responsible for Urban Runoff program implementation. The description shall specifically address:

1. Overall program management, including internal reporting requirements and procedures for communication and accountability;

   a. Interagency or interdepartmental agreements necessary to implement the Permittee's Urban Runoff program

   b. A summary of fiscal resources available to implement the Urban Runoff program;

   c. The ordinances, agreements, plans, policies, procedures and tools (e.g. checklists, forms, educational materials, etc.) used to execute the DAMP, including legal authorities and enforcement tools.

   d. Summarize procedures for maintaining databases required by the Permit;

   e. Describe internal procedures to ensure and promote accountability;

2. WQBELs to implement the TMDLs (Section VI.D);
3. Receiving Water Limitations (Section VII.D).
4. Legal authority/enforcement (Section VIII)
   a. Identify enforcement procedures, and
   b. Identify actions and procedures for tracking return to compliance;
5. Illicit Connections/Illegal Discharges (IC/ID); Litter, Debris and Trash Control (Section IX).

   The procedures and the staff positions responsible for different components of their IC/ID and Illegal Discharge Detection and Elimination (IDDE) Programs.
6. Sewage Spills, Infiltration into the MS4 Systems from Leaking Sanitary Sewer Lines, Septic System Failures, and Portable Toilet Discharges (Section X)

   A description of the interagency or interdepartmental sewer spill response coordination within each Permittee's jurisdiction.
7. Co-Permittee inspection programs(Section XI),
   a. Maintenance of Construction, Industrial, Commercial, and Post-Construction BMP databases;
   b. Procedures for incorporating erosion and sediment control BMPs into the permitting of Construction Sites (Section XI.B)
   c. Implementation of the Residential Program (Section XI.E.)
   d. Specify the verification procedure(s) and any tools utilized to verify that coverage under the General Construction Permit;
8. New Development (Including Significant Redevelopment) (Section XII)
   a. A list of discretionary maps and permits over which the Permittee has the authority to require WQMPs;
   b. Permittee procedures to implement the Hydromodification Management Plan.
   c. Permittee procedures and tools to implement the WQMP.(Sections XII.H, XII.I & XII.K)
   d. Permittee procedures for Municipal Road Projects (Section XII.F).
   e. A description of the credits programs or other in-lieu programs implemented (Section XII.G).
9. Public education and outreach (Section XIII)
10. Permittee Facilities and Activities (Section XIV)
    a. A description of the Permittee's MS4 facilities;
    b. At a minimum a list of facilities that include the following:

i. Parking facilities;

ii. Fire fighting training facilities;

iii. Facilities and activities discharging directly to environmentally sensitive areas such as 303(d) listed waterbodies or those with a RARE beneficial use designation;

iv. POTWs (including water and wastewater treatment plants) and sanitary sewage collection systems;

v. Solid waste transfer facilities;

vi. Land application sites;

vii. Corporate yards including maintenance and storage yards for materials, waste, equipment and vehicles;

viii. Household hazardous waste collection facilities;

ix. Municipal airfields;

x. Maintenance Facilities serving parks and recreation facilities;

xi. Special event venues following special events (festivals, sporting events);

xii. Other municipal areas and activities that the Permittee determines to be a potential source of Pollutants.

11. Compliance of Permittee Facilities and Activities with the General Construction Permit and De-Minimus Permit (Section XIV.G).

12. Training Program for Storm Water Managers, Planners, Inspectors and Municipal Contractors (Section XV);

    a. Training log forms

    b. Identify departments and positions requiring training

B. Within 12 months of approval of the LIP template, and amendments thereof, by the Executive Officer, each Permittee shall complete a LIP[23], in conformance with the LIP template. The LIP shall be signed by the principal executive officer or ranking elected official or their duly authorized representative pursuant to Section XX.M of this Order.

---

[23] As the Principal Permittee is not a general purpose government, some portions of the NPDES MS4 Program may not be applicable to it. The Principal Permittee should identify the basis for its exclusion from the applicable program elements in the appropriate LIP section.

C. Each Permittee shall annually review and evaluate the effectiveness of its Urban Runoff programs to determine the need for revisions to its LIP as necessary in compliance with Section VIII.H of this Order, and document revisions in the Annual Report.

V. DISCHARGE PROHIBITIONS:

A. In accordance with the requirements of 40 CFR 122.26(d)(2)(i)B) and 40 CFR 122.26(d)(2)(i)(F), the Permittees shall prohibit IC/IDs (see Appendix 4) from entering the MS4.

B. The discharge of Urban Runoff from the MS4 to Receiving Waters containing Pollutants, including trash and debris, that have not been reduced consistent with the MEP standard is prohibited.

C. Non-storm Water discharges from public agency activities into Waters of the US are prohibited unless the Non-storm Water discharges are permitted by a NPDES permit, granted a waiver, or as otherwise specified in Section VI, below.

D. Discharges from the MS4 shall be in compliance with the discharge prohibitions contained in Chapter 5 of the Basin Plan.

E. Discharges of Urban Runoff from the Permittee's MS4 shall not cause or contribute to a condition of Pollution, Contamination, or Nuisance (as defined in CWC Section 13050).

F. The discharge of any substances in concentrations toxic to animal or plant life is prohibited.

VI. EFFLUENT LIMITATIONS, DISCHARGE SPECIFICATIONS AND OTHER TMDL RELATED REQUIREMENTS

For purposes of this Order, a discharge may include storm water or other types of discharges identified below.

A. ALLOWED DISCHARGES:

The discharges identified need not be prohibited by the Permittees unless identified by the Permittees or the Executive Officer as a significant source of Pollutants. The DAMP shall include public education and outreach activities directed at reducing these discharges even if they are not substantial contributors of Pollutants to the MS4.

1. Discharges composed entirely of storm water;

2. Air conditioning condensate;
3. Irrigation water from agricultural sources ;
4. Discharges covered by a NPDES Permit, WDRs, or waivers issued by the Regional Board or State Board.
5. Discharges from landscape irrigation, lawn/garden watering and other irrigation waters. These shall be minimized through public education and water conservation efforts, as prescribed under this Order Section XI.E. Residential Program.
6. Passive foundation drains[24];
7. Passive footing drains[25];
8. Water from crawl space pumps[26];
9. Non-commercial vehicle washing,(e.g. residential car washing (excluding engine degreasing) and car washing fundraisers by non-profit organization);
10. Dechlorinated swimming pool discharges (cleaning wastewater and filter backwash shall not be discharged into the MS4 or to Waters of the US)
11. Diverted stream flows[27];
12. Rising ground waters[28] and natural springs;
13. Uncontaminated ground water infiltration as defined in 40 CFR 35.2005 (20) and uncontaminated pumped groundwater (as defined in Appendix 4, glossary),
14. Flows from riparian habitats and wetlands;
15. Emergency fire fighting flows (i.e., flows necessary for the protection of life and property do not require BMPs and need not be prohibited. However, appropriate BMPs to reduce the discharge of Pollutants to the MEP must be implemented when they do not interfere with health and safety issues [see also Appendix K of the DAMP]).
16. Waters not otherwise containing Wastes as defined in California Water Code Section 13050 (d), and
17. Other types of discharges identified and recommended by the Permittees and approved by the Regional Board.

---

[24] Allowed discharges only if the source water drained from the foundation is storm water or uncontaminated groundwater. Discharges from contaminated groundwater may require coverage under the De Minimus Permit (Order No. R8-2009-0003, NPDES No. CAG998001) or General Groundwater Cleanup Permit (Order No. R8-2007-0008, NPDES Permit No CAG918001) or its latest version.

[25] See footnote 24, above.

[26] Allowed discharges only if the discharge is uncontaminated, otherwise permit coverage under the De Minimus Permit or Order No. 2006-0008-DWQ (NPDES No. CAG990002), General NPDES Permit for Discharges from Utility Vaults and Underground Structures to Surface Waters (General Permit-Utility Vaults).

[27] Diversion of stream flows that encroach into Waters of the US requires a 404 permit from the US Army Corps of Engineers and a 401 Water Quality Certification from the Regional Board. Stream diversion that requires active pumping also requires coverage under the De Minimus Permit, Order No. R8-2009-0003.

[28] Discharge of rising ground water and natural springs into surface water is only allowed if groundwater is uncontaminated. Otherwise, coverage under the General Groundwater Cleanup Permit, Order No. R8-2007-0008 may be required.

When types of discharges listed above are identified as a significant source of Pollutants to Waters of the US, a Permittee must either: prohibit the discharge category from entering the MS4 or ensure that Source Control BMPs and Treatment Control BMPs are implemented to reduce or eliminate Pollutants resulting from the discharge. The Permittees shall evaluate the permitted discharges, as listed above to determine if any are a significant source of Pollutants to the MS4 and notify the Executive Officer if any are a significant source of Pollutants to the MS4.

B. DISCHARGE SPECIFICATIONS FOR DISCHARGES FROM PERMITTEE OWNED AND/OR OPERATED FACILITIES AND ACTIVITIES - DE-MINIMUS DISCHARGES[29] :

The following types of discharges from Permittee owned and/or operated facilities and activities are authorized by this Order provided they are in compliance with the terms and conditions of the General De Minimus Permit except that separate coverage under that permit is not required.

1. *Discharges from potable water sources, including water line flushing, superchlorinated water line flushing, fire hydrant system flushing, and hydrostatic test water from pipelines, tanks and vessels*: These discharges shall be dechlorinated to a concentration of 0.1 ppm[30] or less, pH adjusted if necessary, and volumetrically and velocity controlled to prevent re-suspension of sediments.

2. *Discharges from lawn, greenbelt and median watering and other irrigation runoff[31] from non-agricultural operations*: These discharges shall be minimized through requirements consistent with Section 5.3 of the DAMP and Section XIV of this Order.

3. *Dechlorinated swimming pool discharges:* Dechlorinated to a concentration of 0.1 ppm[32] or less, pH adjusted and reoxygenated if necessary, and volumetrically and velocity controlled to prevent resuspension of sediments. Swimming pool cleaning wastewater and filter backwash shall not be discharged to the MS4.

4. *Discharges from facilities that extract, treat and discharge water diverted from Waters of the US*: These discharges shall meet the following conditions:

---

[29] General De Minimus Permit for Discharges to Surface Waters, Order NO. R8-2009-0003, NPDES No. CAG 998001 (General De Minimus Permit).
[30] Total residual chlorine = 0.1 mg/l or parts per million (ppm) or less; compliance determination shall be at a point before the discharge mixes with any Receiving Water.

[31] Non-agricultural irrigation using recycled water must comply with the statewide permit for Landscape Irrigation Using Recycled Water and the State Department Health guidelines.
[32] See footnote 30.

a. The discharges to Waters of the US must not contain Pollutants added by the treatment process or Pollutants in greater concentration than the influent;
b. The discharge must not cause or contribute to a condition of erosion;
c. Be in compliance with Section 401 of the CWA; and
d. Conduct monitoring in accordance with Section XIX of this Order.

5. *Construction dewatering wastes:* The maximum daily concentration limit for Total Suspended Solids (TSS) shall not exceed 75 mg/L; sulfides shall not exceed 0.4 mg/L; total petroleum hydrocarbons shall not exceed 0.1 mg/L; and oil and grease shall not exceed 15 mg/L.

6. *For all de-minimus type of discharges:* The pH of the discharge shall be within 6.5 to 8.5 pH units and there shall be no visible oil and grease in the discharge.

7. Table 4-1 of the Basin Plan incorporates TDS/TIN objectives for groundwater and surface waters within the Santa Ana Region. Permittees discharging to those Receiving Waters shall ensure compliance with the following for Dry Season conditions:

a. For discharges to surface waters where groundwater will not be affected by the discharge, the maximum daily concentration (mg/L) of TDS and/or TIN of the effluent shall not exceed the Water Quality Objectives for the Receiving Water where the effluent is discharged, as specified in Table 4-1 of the Basin Plan[33].
b. For discharges to surface waters where the groundwater will be affected by the discharge, the TDS and/or TIN concentrations of the effluent shall not exceed the Water Quality Objectives for the surface water where the effluent is discharged and the affected groundwater management zone, as specified in Table 4-1 of the Basin Plan. The more restrictive Water Quality Objectives shall govern. However, treated effluent exceeding the groundwater management zone Water Quality Objectives may be returned to the same management zone from which it was extracted without reduction of the TDS or TIN concentrations so long as the concentrations of those constituents are no greater than when the groundwater was first extracted. Incidental increases in the TDS and TIN concentrations (such as may occur during air stripping) of treated effluent will not be considered increases for the purposes of determining compliance with this discharge specification.

8. The Regional Board may add categories of Non-storm Water discharges that are not significant sources of Pollutants or remove categories of Non-storm Water discharges

[33] Resolution No. R8-2004-0001

listed above based upon a finding that the discharges are a significant source of Pollutants.

C. NON-POINT SOURCE (NPS) DISCHARGES:

The NPS discharges are being addressed through the Non-Point Source Program.

D. WATER QUALITY BASED EFFLUENT LIMITATIONS TO IMPLEMENT THE TOTAL MAXIMUM DAILY LOADS (TMDLs)

1. The MIDDLE SANTA ANA RIVER (MSAR) WATERSHED BACTERIA INDICATOR TMDL

Interim WQBELs (effective upon adoption of this Order)

a. The MSAR Permittees[34] as part of the MSAR Task Force (Table 5) shall:

i. Continue to implement the watershed-wide water quality monitoring program (including any future amendments thereto) approved by the Regional Board (Resolution No. R8-2007-0046) as per Task 3 of the MSAR TMDL Implementation Plan.

ii. Submit reports summarizing all relevant data from the MSAR watershed-wide water quality monitoring program. Beginning in 2010, the cool (or wet) season report is due to the Executive Officer by May 31st of each year (for monitoring conducted from November 1st through March 31st) and the warm (dry) season report is due to the Executive Officer by December 31st of each year (for monitoring conducted from April 1st through October 31st).

iii. Submit comprehensive reports every three years summarizing the data collected for the preceding 3 year period and evaluating progress towards achieving the Urban WLA by the dates specified in the TMDL. The first report is due to the Executive Officer on February 15, 2010.

iv. Continue to implement the approved (Regional Board Resolution No. R8-2008-0044) USEP developed as per Task 4.1 of the MSAR TMDL Implementation Plan. The USEP must describe the specific methods that will be used to identify urban sources, strategies, and BMPs to address

[34] Riverside County MS4 Permittees in the MSAR watershed (County of Riverside, and the Cities of Corona, Norco, Riverside are collectively referred to as the "MSAR Permittees")

those sources. Submit semi-annual reports on January 31st and July 31st of each year as required under the approved USEP, and any amendments thereto. In years where the comprehensive report referenced in VI.D.1.a.iii above is due on February 15, the comprehensive report, Dry Season report (Due December 31st) and the January 31st USEP reports may be combined into a single submittal due February 15th

v. Revise the DAMP as specified in Task 4.3 of the MSAR-TMDL Implementation Plan. Summarize any such revisions in the annual report due to the Executive Officer by November 30 of each year.

vi. Revise the WQMP as specified in Task 4.5 of the MSAR TMDL Implementation Plan. Summarize any such revisions in the Annual Report due to the Executive Officer by November 30 of each year.

vii. Amend the LIP to be consistent with the revised DAMP and WQMPs within 90 days after said revisions are approved by the Regional Board. Summarize any such LIP amendments in the Annual Report due to the Executive Officer by November 30 of each year.

Final WQBELs for MSAR Bacterial Indicator TMDL under Dry Season Conditions

b. The final WQBELs for Bacterial Indicators during the Dry Season shall be achieved by December 31, 2015. These final Effluent Limits shall be considered effective for enforcement purposes on January 1, 2016.

c. The Final WQBELs for MSAR Bacterial Indicator TMDL during the Dry Season shall be developed and implemented in the following manner:

i. The MSAR Permittees shall prepare for approval by the Regional Board a Comprehensive Bacteria Reduction Plan (CBRP) describing, in detail, the specific actions that have been taken or will be taken to achieve compliance with the Urban WLA during the Dry Season (April 1st through October 31st) by December 31, 2015. The CBRP must include:

(1) The specific ordinance(s) adopted to reduce the concentration of Bacterial Indicator in urban sources.

(2) The specific BMPs implemented to reduce the concentration of Bacterial Indicator from urban sources and the water quality improvements expected to result from these BMPs.

(3) The specific inspection criteria used to identify and manage the urban sources most likely causing exceedances of Water Quality Objectives for Bacterial Indicators.

(4) The specific regional treatment facilities and the locations where such facilities will be built to reduce the levels of Bacterial Indicator discharged from urban sources and the expected water quality improvements to result when the facilities are complete.

(5) The scientific and technical documentation used to conclude that the CBRP, once fully implemented, is expected to achieve compliance with the Urban WLA for Bacterial Indicator by December 31, 2015.

(6) A detailed schedule for implementing the CBRP. The schedule must identify discrete milestones to assess satisfactory progress toward meeting the Urban WLA during the Dry Season by December 31, 2015. The schedule must also indicate which agency or agencies are responsible for meeting each milestone.

(7) The specific metric(s) that will be established to demonstrate the effectiveness of the CBRP and acceptable progress toward meeting the Urban WLA for Bacterial Indicator by December 31, 2015.

(8) The DAMP, WQMP and LIPs shall be revised consistent with the CBRP no more than 180 days after the CBRP is approved by the Regional Board.

(9) Detailed descriptions of any additional BMPs planned, and the time required to implement those BMPs, in the event that data from the watershed-wide water quality monitoring program indicate that Water Quality Objectives for Bacterial Indicator are still being exceeded after the CBRP is fully implemented.

(10) A schedule for developing a CBRP needed to comply with the Urban WLA for Bacterial Indicator during the Wet Season (November 1st thru March 31st) to achieve compliance by December 31, 2025.

ii. The draft CBRP must be submitted to the Regional Board by December 31, 2010. The Permittees may submit the plan individually, jointly or through a collaborative effort with other urban dischargers such as the existing MSAR-TMDL Task Force. Regional Board staff will review the draft CBRP and recommend necessary revisions no more than 90 days after receiving the draft CBRP. The MSAR Permittees must submit the final version of the CBRP no more than 90 days after receiving the comments from Regional

Board staff. The Regional Board will schedule a public hearing to consider approving the CBRP, as a final WQBEL for the Dry Season Urban WLA, no more than 120 days after the final plan is submitted by the MSAR Permittees. In approving the CBRP as the final WQBELs, the Regional Board shall find that the CBRP, when fully implemented, shall achieve the Urban WLA for Bacterial Indicator by December 31, 2015.

iii. Once approved by the Regional Board, the CBRP shall be incorporated into this Order as the final WQBELs for Bacterial Indicator for the Dry Season. Based on BMP effectiveness analysis, the CBRP shall be updated, if necessary. The updated CBRP shall be implemented upon approval by the Regional Board.

d. Should the process set forth in Section VI.D.1.c, above not be completed by January 1, 2016, then the Urban WLA for the Dry Season specified in the MSAR-TMDL shall become the final numeric WQBELs for Bacterial Indicator in the Dry Season as follows:

i. WLA for Fecal Coliform from Urban Sources for the Dry Season (April 1st through October 31st)[35]
5-sample/30-day logarithmic mean less than 180 organisms/100mL and not more than 10% of the samples exceed 360 organisms/100mL for any 30-day period.

ii. WLA for *E. Coli* from Urban Sources for the Dry Season (April 1st through October 31st)[36]
5-sample/30-day logarithmic mean less than 113 organisms/100 mL and not more than 10% of the samples exceed 212 organisms/100mL for any 30-day period.

<u>Final WQBELs for Bacterial Indicator during the Wet Season (effective Jan. 1, 2026)</u>

In the event this Order is still in effect on December 31, 2025, and the Regional Board has not adopted alternative final WQBEL during the Wet Season by that date, then the Urban WLAs specified in the MSAR TMDL for the Wet Season

---

[35] 5-sample/30-day logarithmic mean less than 180 organisms/100mL and not more than 10% of the samples exceed 360 organisms/100mL for any 30-day period.

[36] 5-sample/30-day logarithmic mean less than 113 organisms/100 mL and not more than 10% of the samples exceed 212 organisms/100mL for any 30-day period.

(November 1st through March 31st) will automatically become the final numeric WQBEL for the MSAR Permittees on January 1, 2026.

2. **LAKE ELSINORE/CANYON LAKE (SAN JACINTO WATERSHED) NUTRIENT TMDLS**

Interim WQBELS:

a. *Lake Elsinore In-Lake Sediment Nutrient Reduction Plan:* Pursuant to Resolution No. R8-2007-0083, or as amended by subsequent adopted Regional Board resolutions, each LE/CL Permittee shall continue to implement the approved strategy for reducing in-lake sediment nutrient loads as summarized in Table 7, below:

Table 7 - Lake Elsinore In-lake Sediment Nutrient Reduction Strategy

Lake Elsinore In-lake Sediment Reduction Strategy Task	Due Date
Submit Phase 2 Alternatives	December 31, 2010*
Submit O&M Agreement for Fishery Management Program	December 31, 2010*
Submit O&M Agreement for Aeration and Mixing Systems	December 31, 2010*
Submit Phase 2 Projects Plans	June 30, 2011*
Complete Phase 2 Project Implementation	December 31, 2014
Implement in-lake and watershed monitoring programs	Annual reports due August 31 every year.

*Within 60 days of receipt of comments from Regional Board staff, Permittees shall submit a final revised plan that will be acceptable for adoption by the Regional Board, unless otherwise directed by the Executive Officer.

b. Lake Elsinore/Canyon Lake Model Update Plan: Pursuant to Resolution No. R8-2007-0083, or as amended by subsequent adopted Regional Board resolutions, each LE/CL Permittee shall continue to implement the Model Update Plan as per the schedule summarized Table 8 below: The Model Update Plan shall specify how the Permittees will determine compliance with the WLAs.

Intentionally Blank

Table 8 - Lake Elsinore/Canyon Lake Model Update Plan

Model Update Task	Due Date
Linkage Analysis Study	August 31, 2010
Watershed Source Loading Study	August 31, 2010
Model Evaluation	December 31, 2010
Construct/Calibrate Model	June 30, 2011
Conduct Model Scenarios	August 31, 2011
Model Update Final Report	November 30, 2011

c. Revise the DAMP, WQMP and LIPs as necessary to implement the interim WQBEL compliance plans submitted pursuant to paragraph a and b of this section and summarize all such revisions in the Annual Report.

Final WQBELs (Effective December 31, 2020)

d. To achieve compliance with TMDL WLAs as per the TMDL Implementation Plans, the LE/CL Permittees shall submit a Comprehensive Nutrient Reduction Plan (CNRP) by December 31, 2011 describing, in detail, the specific actions that have been taken or will be taken to achieve compliance with the urban WLA by December 31, 2020. The CNRP must include the following:

i. Evaluation of the effectiveness of BMPs and other control actions implemented. This evaluation shall include the following:

(a) The specific ordinance(s) adopted or proposed for adoption to reduce the concentration of nutrient in urban sources.

(b) The specific BMPs implemented to reduce the concentration of urban nutrient sources and the water quality improvements expected to result from these BMPs.

(c) The specific inspection criteria used to identify and manage the urban sources most likely causing exceedances of water quality objectives for nutrients.

(d) The specific regional treatment facilities and the locations where such facilities will be built to reduce the concentration of nutrient discharged from urban sources and the expected water quality improvements to result when the facilities are complete.

and

ii. Proposed method for evaluating progress towards compliance with the nutrient WLA for Urban Runoff. The progress evaluation shall include:

(a) The scientific and technical documentation used to conclude that the CNRP, once fully implemented, is expected to achieve compliance with the urban waste load allocation for nutrient by December 31, 2020.

(b) A detailed schedule for implementing the CNRP. The schedule must identify discrete milestones decision points and alternative analyses necessary to assess satisfactory progress toward meeting the urban waste load allocations for nutrient by December 31, 2020. The schedule must also indicate which agency or agencies are responsible for meeting each milestone.

(c) The specific metric(s) that will be established to demonstrate the effectiveness of the CNRP and acceptable progress toward meeting the urban waste load allocations for nutrient by December 31, 2020.

(d) The DAMP, WQMP and LIPs shall be revised consistent with the CNRP no more than 180 days after the CNRP is approved by the Regional Board.

(e) Detailed descriptions of any additional BMPs planned, and the time required to implement those BMPs, in the event that data from the watershed-wide water quality monitoring program indicate that water quality objectives for nutrient are still being exceeded after the CNRP is fully implemented.

e. The draft CNRP must be submitted to the Regional Board by December 31, 2011. The LE/CL Permittees may submit the plan individually, jointly or through a collaborative effort with other urban dischargers such as the existing LE/CLTMDL Task Force. Regional Board staff will review the document and recommend necessary revisions no more than 90 days after receiving the draft plan. The LE/CL Permittees must submit the final version of the plan no more than 90 days after receiving the comments from Regional Board staff. The Regional Board will schedule a public hearing to consider approving the CNRP, as a final water quality-based effluent limitation for the Nutrient WLA, no more than 90 days after the final plan is submitted by the LE/CL Permittees. In approving the CNRP as the final WQBELs, the Regional Board shall make a finding that the CNRP, when fully implemented, shall achieve the urban WLA for nutrient by December 31, 2020; and,

f. Once approved by the Regional Board, the CNRP shall be incorporated into this Order as the final WQBELs for LE/CL Nutrient TMDL. Based on BMP effectiveness analysis, the CNRP shall be updated, if necessary. The updated CNRP shall be implemented upon approval by the Regional Board.

g. Compliance with the WLA is based on a 10-year running average. Hence, data collection consistent with the approved Phase 2 LE/CL TMDL monitoring program required in the Monitoring and Reporting Program must commence by December 31, 2010[37].

h. A summary of all relevant data from water quality monitoring programs shall be submitted in the Annual Report. This will include an evaluation of compliance with the LE/CL TMDL by reporting the effectiveness of the BMPs implemented in the watershed to control nutrient inputs into the lake from Urban Runoff pursuant to Regional Board Resolution No. R8-2006-0031 and R8-2007-0083, or as amended by subsequent Regional Board adopted resolutions.

i. The DAMP, WQMP and LIPs shall be revised as necessary to implement the plans submitted pursuant to paragraph a through h of this section and summarize all such revisions in the Annual Report.

j. In the event that the Regional Board has not adopted alternative final WQBELs, in accordance with Section VI.D.2.d., above, by December 31, 2020, the Urban WLAs specified in Tables 9 and 10, below, shall automatically become the final numeric WQBELs for the LE/CL Permittees to be achieved by December 31, 2020. These final Effluent Limits shall be considered effective for enforcement purposes on January 1, 2021.

Table 9 - Canyon Lake Nitrogen and Phosphorus Waste Load and Load Allocations[a]

Canyon Lake Nutrient TMDL	Final Total Phosphorus Waste Load Allocation (kg/yr)[b, c]	Final TN Waste Load Allocation (kg/yr)[b, c]
Urban	306 (675 lbs/yr)	3,974 (8763 lbs/yr)
Septic systems	139 (306 lbs/yr)	4,850 (10692 lbs/yr)

[a] The WLAs for Canyon Lake apply to those land uses located upstream of Canyon Lake.
[b] Final WLA compliance to be achieved by December 31, 2020.
[c] TMDL and WLA specified as 10-year running average.

Table 10 - Lake Elsinore Nitrogen and Phosphorus Waste Load and Load Allocations[a]

[37] Resolution No. R8-2004-0037 requires initiation of the Phase 2 watershed-wide Wet Season monitoring upon completion of the Phase 1 in-lake monitoring program. Regional Board staff is currently in discussion with LE/CL TMDL Task Force regarding this transition and are expected to identify reductions in Phase 1 monitoring program that will offset the costs of the enhanced Phase 2 program.

Lake Elsinore Nutrient TMDL	Final Total Phosphorus WLA (kg/yr)[b, c]	Final TN WLA (kg/yr)[c, d]
Urban	124 (273.3 lbs/yr)	349 (769.4 lbs/yr)
Septic systems	69 (152 lbs/yr)	608 (1340 lbs/yr)

[a] The Lake Elsinore TMDL WLAs for septic systems only apply to those land uses located downstream of Canyon Lake.

[b] Final compliance to be achieved by December 31, 2020.

[c] TMDL and WLA specified as 10-year running average.

[d] WLA for supplemental water should be met as a 5 year running average by December 31, 2020.

[e] WLA for Canyon Lake overflows

k. The LE/CL Permittees may demonstrate compliance with the WLAs using either of the following two methods:

i. Directly, using relevant monitoring data and approved and approved modeling procedures to estimate actual nitrogen and phosphorus loads being discharged to the lakes, or,

ii. Indirectly, using water quality monitoring data and other biological metrics approved by the Regional Board, to show Water Quality Standards are being consistently attained (as measured by the response targets identified in the LE/CL TMDL).

l. The TMDLs explicitly support the trading of pollutant allocations among sources to the extent that such allocation tradeoffs optimize point and non-point source control strategies to achieve the WQBELs in the most efficient manner.

VII. RECEIVING WATER LIMITATIONS

A. Urban Runoff discharges from the Permittees' MS4 shall not cause or contribute to exceedances of Receiving Water Quality Standards (as defined by Beneficial Uses and Water Quality Objectives in Chapter 4 of the Basin Plan) for surface waters or ground waters.

B. The DAMP and its components, including the LIPs, must be designed to achieve compliance with Receiving Water Limitations associated with discharges of Urban Runoff to the MEP. It is expected that compliance with Receiving Water Limitations will be achieved through an iterative process and the application of increasingly more effective BMPs.

C. The Permittees shall comply with Section V.B and VII.A of this Order, through timely implementation of control measures and other actions to reduce Pollutants in Urban Runoff in accordance with the DAMP and other requirements of this Order, including modifications thereto.

D. If exceedances of Water Quality Standards persist notwithstanding implementation of the DAMP and other requirements of this Order, the Permittees shall assure compliance with Sections V.B and VII.A of this Order, by complying with the following procedure:

1. Upon a determination by either the Permittees or the Executive Officer that the discharges from the MS4 are causing or contributing to an exceedance of an applicable Water Quality Standard, the Permittees shall:

   a. Promptly, within two (2) working days, provide oral or e-mail and thereafter submit a report to the Executive Officer that describes the BMPs that are currently being implemented and the additional BMPs that will be implemented to prevent or reduce those Pollutants that are causing or contributing to the exceedance of the applicable Receiving Water Quality Standards.

   b. The report may be incorporated in the annual update to the DAMP, unless the Executive Officer directs an earlier submittal.

   c. The report shall include an implementation schedule.

   d. The Executive Officer may require modifications to the report.

   e. Submit any modifications to the report required by the Executive Officer within 30 days of notification;

2. Within 30 days following approval by the Executive Officer of the report described above, the Permittees shall revise the DAMP, applicable LIPs, and monitoring program to incorporate the approved modified BMPs that have been and will be implemented, the implementation schedule, and any additional monitoring required;

3. Implement the revised DAMP, applicable LIPs and monitoring program in accordance with the approved schedule.

4. If the exceedance is solely due to discharges to the MS4 from activities or areas outside the Permittees jurisdiction or control, the Permittees must, within two (2) working days of becoming aware of the situation, provide oral or e-mail notice to the Executive Officer of the determination of the exceedance and provide written documentation of these discharges to the Executive Officer within ten (10) calendar days of becoming aware of the situation.

5. So long as the Permittees have complied with the procedures set forth above and are implementing the revised LIP, DAMP, and monitoring program, the Permittees do not have to repeat the same procedure for continuing or recurring exceedances of the same Receiving Water Limitation unless the Executive Officer determines it is necessary to develop additional BMPs

6. Nothing in Section VII.D prevents the Regional Board from enforcing any provision of this Order while the Permittee prepares and implements the above report.

VIII. LEGAL AUTHORITY/ENFORCEMENT

A. The Permittees shall maintain adequate legal authority to control the discharge of Pollutants to the MS4 from Urban Runoff and enforce those authorities. This may be accomplished through ordinance, statute, permit, contract or similar means. Such legal authority must address all IC/IDs into the MS4, including those from residential, commercial, industrial and construction sites. The Permittees shall use the enforcement guidelines developed in Section 3.4 and 4.5 of the DAMP or develop their own enforcement program and shall incorporate the enforcement program into their LIP. Such legal authority must also at a minimum include and authorize the Permittees to:

1. Carry out all inspections, surveillance, and monitoring necessary to determine compliance and noncompliance with their ordinances and permits. The Permittee must have authority, to the extent permitted by California and federal Law and subject to the limitations on municipal action under the constitutions of California and the United States, to enter, monitor, inspect, and gather evidence (pictures, videos, samples, documents, etc.) from residential, industrial, commercial, and construction sites discharging into the MS4 within the limits of its statutory authority. The Permittees shall progressively and decisively take enforcement actions against any violators of the Storm Water Ordinance. These enforcement actions must, at minimum, meet the guidelines and procedures listed in Sections 3.4 and 4.5 of the DAMP.

2. Control the contribution of Pollutants to the MS4;

3. Stop Pollutant discharge or threat of discharge if a discharger is unable or unwilling to correct significant non-compliance where there is a serious threat to public health or the environment;

4. Require the use of BMPs to prevent or reduce the discharge of Pollutants into MS4 consistent with the MEP standard.

5. Require documentation on the effectiveness of BMPs implemented to reduce the discharge of Pollutants to the MS4; and

6. The Co-Permittees' Storm Water Ordinances or other local regulatory mechanisms shall include sanctions to ensure compliance. Sanctions shall include but are not limited to: oral and/or written warnings, notice of violation or non-compliance, administrative compliance orders, stop work or cease and desist order, a civil citation or injunction, the imposition of monetary penalties or criminal prosecution (infraction or misdemeanor). These sanctions shall be issued in a decisive manner within a predetermined timeframe, from the time of the violation's occurrence and/or follow-up inspection.

B. The Co-Permittees shall take progressive and decisive enforcement actions against violators of their Storm Water Codes and Ordinances, in accordance with the federal storm water regulations (40CFR, Part 122.26(d)(2)(I)(A-F)), and adopted/established guidelines and procedures as described in Section 3.4 of the DAMP. The Co-Permittees shall consider the time to return to compliance as one measure of effectiveness of their Storm Water Ordinances or enforcement response procedure. The Co-Permittees shall document these actions in their records (including electronic databases as outlined in the DAMP) and Annual Reports. The Co-Permittees shall use their authority to bring dischargers into immediate compliance with enforcement actions.

C. Within three (3) years of adoption of this Order, the Co-Permittees shall promulgate and implement ordinances that would control known pathogen or Bacterial Indicator sources such as animal wastes, if necessary.

D. The Co-Permittees shall continue to provide notification to the Executive Officer of storm water related information obtained during site inspections of construction and industrial sites regulated by the General Storm Water Permits and of sites that should be regulated under the General Storm Water Permits. The notification should include perceived violations of the General Storm Water Permits or local requirements, prior history of violations of the Permittee's Storm Water Ordinance, enforcement actions related to the Storm Water Ordinance taken by the Permittee, and other relevant information. In addition, Sections XVI.B of this Order addresses additional notification requirements for construction, industrial and commercial sites not covered under the General Storm Water Permits. Notification shall not prevent or delay the Co-Permittees from independently taking appropriate actions to bring Construction Sites and Industrial Facilities into compliance with their local ordinances, rules, regulations and WQMP.

E. The Permittees are encouraged to enter into interagency agreements with owners of other MS4, such as CalTrans, school and college districts, universities, Department of Defense, Native American Tribes, etc., to control the contribution of Pollutants into their

MS4 from the non-Permittee MS4. The Regional Board will continue to notify the owner/operator of the MS4 systems and the Permittee if the Board issues a permit for discharges into the MS4.

F. The Co-Permittees shall annually review their Storm Water Ordinances and provide findings within the Annual Report on the effectiveness of these ordinances and enforcement programs in prohibiting the following types of discharges to the MS4 (the Co-Permittees may propose appropriate BMPs in lieu of prohibiting these discharges, where the Co-Permittees are responsible for ensuring that dischargers adequately maintain those BMPs):

1. Sewage, where a Co-Permittee operates the sewage collection system (also prohibited under the Statewide SSO Order[38]);
2. Wash water resulting from the hosing or cleaning of gas stations, auto repair garages, and other types of automobile service stations;
3. Discharges resulting from the cleaning, repair, or maintenance of any type of equipment, machinery, or facility, including motor vehicles, concrete mixing equipment, portable toilet servicing, etc.;
4. Wash water from mobile auto detailing and washing, steam and pressure cleaning, carpet/upholstery cleaning, pool cleaning and other such mobile commercial and industrial activities;
5. Water from cleaning of municipal, industrial, and commercial sites, including parking lots, streets, sidewalks, driveways, patios, plazas, work yards and outdoor eating or drinking areas, etc.;
6. Runoff from material storage areas or uncovered receptacles that contain chemicals, fuels, grease, oil, or other Hazardous Materials[39];
7. Discharges of runoff from the washing of hazardous material from paved or unpaved areas;
8. Discharges of pool or fountain water containing chlorine, biocides, or other chemicals; pool filter backwash containing debris and chlorine;
9. Pet waste, yard waste, litter, debris, sediment, etc.; and,
10. Restaurant or food processing facility wastes such as grease, floor mat and trash bin wash water, food waste, etc.

---

[38] State Board WQO No. 2006-0003.
[39] Hazardous material is defined as any substrate that poses a threat to human health or the environment due to its toxicity, corrosiveness, ignitability, explosive nature or chemical reactivity. These also include materials named by EPA to be reported if a designed quantity of the material is spilled into the waters of the United States or emitted into the environment.

G. Within 24 months after Order adoption, each Co-Permittee shall submit a certification statement, signed by its legal counsel, that the Co-Permittee has obtained all necessary legal authority in accordance with 40 CFR 122.26(d)(2)(i) (A-F) and to comply with this Order through adoption of ordinances and/or municipal code modifications. A copy of the certification shall also be placed in the LIP.

H. Annually thereafter, Permittees shall evaluate the effectiveness of implementation and enforcement response procedures with respect to the above items. The findings of these reviews, along with recommended corrective actions, where appropriate, and schedules shall be submitted as part of the Annual Report for the corresponding reporting period. The LIP shall be updated accordingly.

IX. ILLICIT CONNECTIONS/ILLEGAL DISCHARGES (IC/ID); LITTER, DEBRIS AND TRASH CONTROL

A. Consistent with each Co-Permittees statutory authority, the Co-Permittees have adopted Storm Water Ordinances. The Co-Permittees must continue to prohibit IC/IDs to the MS4 through their Storm Water Ordinances and the Principal Permittee must do so through its statutory authority. In addition, the Permittees must continue to implement and improve routine inspection and monitoring and reporting programs for their MS4 facilities. If routine inspections or Dry Season monitoring indicate IC/IDs, they must be investigated and eliminated or permitted within sixty (60) calendar days of receipt of notice by its staff or from a third party.

B. The Permittees upon being put on notice by staff or a third party must immediately (within 24 hours of receipt of notice by its staff or from a third Party) investigate all spills, leaks, and/or other illegal discharges to the MS4. Based upon their assessment and as specified below, the Permittees must provide notifications and reporting as described in Section 4 of the DAMP and Section XVI of this Order.

C. The Permittees shall control Illegal Dumping that may result in a discharge of Pollutants to the MS4 to the MEP. The Permittees shall describe their procedures and authorities for managing Illegal Dumping in their LIP.

D. Within 18 months of adoption of this Order, the Permittees shall review and revise their IC/ID program to include a pro-active IDDE using the Guidance Manual for Illicit Discharge, Detection, and Elimination by the Center for Watershed Protection[40] or any

---

[40] USEPA (Illicit Discharge Detection and Elimination - A Guidance Manual for Program Development and Technical Assessments) by the Center for Watershed Protection and Robert Pitt, University of Alabama, October 2004, updated 2005).

other equivalent program consistent with Section IX.E below. The result of this review shall be reported in the Annual Report and include a description of the Permittees' revised pro-active program, procedures and schedules. The LIP shall be updated accordingly.

E. The Permittees' revised IC/ID programs shall specify an IDDE program for each Co-Permittee to individually, or in combination:

   a. Develop an inventory and map of Permittee MS4 facilities and Outfalls to Receiving Waters.

   b. Develop a schedule to be submitted within 18 months to conduct and implement systematic investigations of MS4 open channels and Major Outfalls.

   c. Use field indicators to identify potential Illegal Discharges, if applicable;

   d. Track Illegal Discharges to their sources[41] where feasible; and

   e. Educate the public about Illegal Discharges and Pollution Prevention where problems are found.

F. The Permittees shall continue to integrate IC/ID detection and elimination into their inspection programs, training of Permittee staff, and monitoring data collection and other indicator data.

G. The Permittees shall annually review and evaluate their IC/ID program, including litter/trash BMPs, to determine if the program needs to be adjusted. Findings of the review and evaluation shall be submitted with the Annual Report.

H. The Permittees shall maintain a database summarizing IC/ID incident response (including IC/IDs detected as part of field monitoring activities). This information shall be updated on an ongoing basis and submitted with the Annual Report.

I. The Permittees shall control, consistent with the MEP standard, Illegal Discharges (including the discharge of spills, leaks, or dumping of any materials other than storm water and authorized non-storm water) into the MS4. All reports of Illegal Discharge shall be promptly investigated and reported as specified in Section XVI (Notification Requirements).

J. In the 2004-2005 Annual Report, the Permittees characterized trash, determined its main source(s) and developed and implemented appropriate BMPs to reduce and/or to eliminate the discharge of trash and debris to Waters of the US to the MEP. The BMPs should be continued and their effectiveness must be reported in the Annual Report.

K. Where non-jurisdictional IC/IDs within a Permittees jurisdiction are identified, the Permittees will notify the responsible party and the Executive Officer of the discharge.

---

[41] Table 2: Land uses, Generating Sites and Activities that Produce Indirect Discharges from IDDE, A Guidance Manual for Program Development and Technical Assessments, October 2004 CWP.

X. SEWAGE SPILLS, INFILTRATION INTO THE MS4 SYSTEMS FROM LEAKING SANITARY SEWER LINES, SEPTIC SYSTEM FAILURES, AND PORTABLE TOILET DISCHARGES

A. The Permittees shall continue to provide local sanitation districts 24-hour access to the MS4 to address sewage spills. The Permittees shall continue to work cooperatively with the local sewer agencies to determine and control the impact of infiltration from leaking sanitary sewer systems on Urban Runoff quality. Each Permittee shall implement control measures necessary to minimize infiltration of seepage from sanitary sewers to the MS4 through routine preventative maintenance of the MS4.

B. Each Permittee shall continue to cooperate and coordinate with the sewage collection/treatment agencies as described in Appendix I of the DAMP to swiftly respond to and contain sewage spills that may discharge into its MS4. Management and/or preventive measures shall continue to be implemented for sources including portable toilets, failing septic systems, and failing private laterals that may cause or contribute to Urban Runoff Pollution problems in Permittee jurisdictions.

C. Permittees who are regulated under the SSO Order No. 2006-0003-DWQ, shall continue to comply with that Order to control sanitary system overflows.

D. Permittees with septic systems in their jurisdiction shall maintain the inventory of septic systems within its jurisdiction completed in 2008. Updates to the inventory will be maintained by County Environmental Health via a database of new septic systems approved since 2008.

XI. CO-PERMITTEE INSPECTION PROGRAMS

The Permittee inspection programs are outlined in Sections 7 and 8 of the DAMP and describe some of the minimum inspection and enforcement procedures utilizing existing inspection programs, provides criteria for characterizing the significance of violations, criteria for prioritizing violations, appropriate response actions corresponding to the priority of violations and identifies the hierarchy of enforcement/compliance responses. Section 3.4 of the DAMP provides a framework to standardize the implementation and enforcement by the Co-Permittees of their respective Storm Water Ordinances. The Co-Permittees shall continue to enforce their respective Storm Water Ordinances consistent with the DAMP and this Order.

A. GENERAL REQUIREMENTS

1. The Co-Permittees shall continue to maintain and update a database inventory of all active Construction Sites, and Industrial and Commercial Facilities within their jurisdiction consistent with the database requirements of Section 7 and 8 of the DAMP. Construction Sites and Industrial and Commercial Facilities shall be

included in the database inventories regardless of whether the Construction Sites or Commercial and Industrial Facilities are subject to the General Construction Permit or the General Industrial Permit or other individual NPDES permit or WDRs.

2. The Co-Permittee inspection database inventory described in Section XI.A.1 shall be maintained in an electronic database format that may be made available to the Regional Board upon request (e.g. request via phone call, e-mail, letter, etc,). The database inventory must be consistent with the requirements of Sections 7 and 8 of the DAMP. Supporting paper (or electronic) files shall also be maintained and made available upon Regional Board request. Supporting files should include a record of inspection dates, the results of each inspection, photographs (if any), video (if any) and a summary of any enforcement actions taken. The inventory databases shall be updated on an annual basis and an electronic copy shall be provided with each Annual Report.
3. The Co-Permittee shall not issue an occupancy permit to an Industrial Facility or other license authorizing the facility to operate, unless the applicant is informed of the General Industrial Permit and that it may have to secure coverage under the General Industrial Permit. The Co-Permittees shall verify during Industrial Facility inspections whether a site has obtained necessary permit coverage under the General Industrial Permit.
4. If the Industrial Facility's SIC code falls under the mandatory category the Co-Permittee shall notify the Regional Board and the applicant that they may be required to obtain coverage under the General Industrial Permit.
5. Permits for Construction Sites shall not be granted until appropriate coverage under the General Construction Permit (s) is verified.
6. Perceived Non-filers for the General Storm Water Permits shall be reported consistent with Section XVI.E.
7. If a Co-Permittee receives notice by its staff or from a third party of a non-Emergency Situation representing a possible violation of the General Storm Water Permit or other permit issued by the State or Regional Board to an Industrial Facility or Construction Site, the Co-Permittee shall, within two (2) working days, provide oral or e-mail notice to Regional Board staff of the location within its jurisdiction where the incident occurred and describe the nature of the incident. After notifying the Regional Board, no further action is necessary regarding the General Storm Water Permits. However, each Co-Permittee shall take appropriate actions to bring an Industrial Facility or Construction Site into compliance with its Storm Water Ordinances.
8. The Co-Permittees need not inspect facilities already inspected by Regional Board staff if the inspection was conducted within the specified time period. Regional

Board staff inspection information is available at www.ciwqs.ca.gov[42].

9. Each Co-Permittee shall respond to complaints received from third parties regarding Construction Sites and Industrial and Commercial Facilities in a timely manner to ensure that the sites are not a source of Pollutants to the MS4 and the Receiving Waters.

10. The Co-Permittees shall enforce their Storm Water Ordinances and permits at all Construction Sites and Industrial, and Commercial Facilities in a fair, firm and consistent manner. Sanctions for non-compliance as required under Section VIII (Legal Authority/Enforcement) shall be deemed adequate to bring the site into compliance with their Storm Water Ordinances and permits.

11. Each Co-Permittee shall document, evaluate and annually report the effectiveness of its enforcement procedures in achieving prompt and timely compliance with inspection programs. Sanctions for non-compliance shall be adequate to bring the site into compliance and to stop the Pollutant discharge consistent with the requirements of Section VIII of this Order.

12. The Principal Permittee and the County have implemented the CAP. Through the Riverside County Department of Environmental Health, the CAP addresses storm water compliance issues at restaurant facilities and businesses that must have a hazardous material permit for either storing, handling or generating hazardous materials. As described in Section 8 of the DAMP, the Permittees must either participate in the CAP or implement an equivalent inspection program. The cities of Corona and Riverside maintain such programs through their respective POTW pre-treatment programs that may be supplemented by the activities of the Department of Environmental Health during routine inspections. The County is establishing a stand-alone NPDES Storm water Compliance Inspection and Enforcement Program (CIEP) for Industrial and Commercial Facilities in the unincorporated areas of the County.

13. Where inspections and/or enforcement required by this Order are carried out on behalf of the Co-Permittee by other agencies or departments such as the County Department of Environmental Health, county and local fire departments, hazardous materials programs, code enforcement, industrial pretreatment, and building and safety, the Co-Permittee shall monitor and annually evaluate and report adequacy of program coverage and enforcement response in complying with this Order.

14. All inspectors shall be trained in accordance with Section XV.

---

[42] To obtain access to the State database, registration at the following link is necessary: http://www.waterboards.ca.gov/water_issues/programs/ciwqs/chc_npdes.shtml. Contact information is available at http://www.waterboards.ca.gov/water_issues/programs/ciwqs/contactus.shtml.

B. CONSTRUCTION SITES

1. Each Co-Permittee shall include in the electronic database identified in Section XI.A.2 an inventory of all Construction Sites within its jurisdiction for which building or grading permits have been issued and activities at the site include: soil movement; uncovered storage of materials or wastes, such as dirt, sand or fertilizer; or exterior mixing of cementaceous products, such as concrete, mortar or stucco.

2. Each Permittee shall continue to prioritize Construction Sites within its jurisdiction as a high, medium or low threat to water quality. Evaluation of construction sites shall be based on factors, which shall include but not be limited to: soil erosion potential, project size, proximity and sensitivity of Receiving Waters and any other relevant factors. At a minimum, high priority Construction Sites shall include: sites disturbing 50 acres and greater; sites disturbing over 1 acre with Direct Discharge to Receiving Waters with CWA Section 303(d) listed waters for sediment or turbidity impairments; site specific characteristics[43] ; and any other relevant factor. At a minimum, medium priority construction sites shall include: sites disturbing between 10 to less than 50 acres of disturbed soil.

3. Each Permittee shall conduct Construction Site inspections for compliance with its ordinances (grading, WQMPs, etc.) and local permits (building, grading, etc.). The Permittees shall develop a checklist for conducting Construction Site inspections. Inspections of Construction Sites shall include, but not be limited to:

   a. Verification of coverage under the General Construction Permit (PRDs or Waste Discharge Identification Number [WDID]) during the initial inspection. As Permittees become aware of changes in ownership, they shall notify Regional Board staff.

   b. Ensure that the BMPs implemented on-site are effective for the appropriate phase of construction (preliminary stage, mass grading stage, streets and utilities stage etc.).

   c. Visual observations for Illegal Discharges, potential Illicit Connections, and potential Pollutant sources.

   d. Implementation and maintenance of BMPs required under local requirements.

   e. An assessment of the effectiveness of BMPs implemented at the site and the need for any additional BMPs.

---

[43] The recently adopted General Construction Permit Order No. 2009-0009-DWQ includes risk-based characterization of construction sites based on site-specific conditions.

4. At a minimum, the inspection frequency shall include the following:
   a. During the Wet Season (October 1 through May 31 of each year), all high priority Construction Sites are to be inspected, in their entirety, once a month. All medium priority Construction Sites are to be inspected at least twice during the Wet Season. All low priority Construction Sites are to be inspected at least once during the Wet Season. Construction Sites that disturb less than one acre may be inspected on an as needed basis. When BMPs or BMP maintenance is deemed inadequate or out of compliance, an inspection frequency of at least once per week should be maintained until BMPs and BMP maintenance are brought into compliance.
   b. During the Dry Season (June 1 through September 30 of each year), all Construction Sites shall be inspected at a frequency sufficient to ensure that sediment and other Pollutants are properly controlled and that unauthorized, Non-storm Water discharges are prevented.

C. INDUSTRIAL FACILITIES

1. To establish priorities for inspection, the Permittees shall continue to prioritize Industrial Facilities within their jurisdiction as a high, medium, or low threat to water quality. Continual evaluation of these Industrial Facilities should be based on such factors as type of industrial activities (i.e., SIC codes), materials or wastes used or stored outside, Pollutant discharge potential, compliance history, facility size, proximity and sensitivity of Receiving Waters and any other relevant factors described in Section 8 of the DAMP. At a minimum, a high priority shall be assigned to: Industrial Facilities subject to section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA); Industrial Facilities that handle or generate Pollutants for which the receiving water is impaired, facilities that have a significant potential to release pre-production plastics or nurdles into the environment, and Industrial Facilities with a high potential for or history of unauthorized, Non-storm Water discharges.
2. Each Co-Permittee shall conduct Industrial Facility inspections for compliance with its ordinances, permits and this Order. Industrial Facility inspections shall be consistent with Section 8 of the DAMP. If an inspection indicates the need for follow-up, Co-Permittee follow-up inspections shall include a review of the Industrial Facility's material and waste handling and storage practices, written documentation of Pollutant control BMP implementation and maintenance procedures, digital photographic documentation of water quality violations as well as evidence of past or present unauthorized, Non-storm Water discharges and enforcement actions issued at the time of the Co-Permittee inspection. Report of inspections shall be included in the Annual Report and shall provide the basis for downgrading or upgrading priority ranking of Industrial Facilities.

3. All high priority Industrial Facilities are to be inspected at least once a year; all medium priority Industrial Facilities are to be inspected at least once every two years; and all low priority Industrial Facilities are to be inspected at least once during the term of this Order. In the event that inappropriate material or waste handling or storage practices are observed, or unauthorized, non-storm water discharges are observed, an enforcement order shall be issued and a re-inspection frequency adequate to bring the Industrial Facility into compliance must be maintained (at a minimum, once a month or within the compliance schedule prescribed by the Co-Permittee in a written notice to the discharger). Once compliance is achieved, a minimum inspection frequency of once every six months should be maintained for the annual reporting period.
4. Each Co-Permittee shall continually identify undocumented Industrial Facilities within its jurisdiction and shall add them to the database, as identified in Section XI.A.2. Additionally, each Industrial Facility shall be listed as per the criteria in specified in Section XI.C.1 within 15 days from the initial date of discovery of the Industrial Facility.
5. Each Permittee shall require Industrial Facilities to implement source control and pollution prevention measures consistent with the requirements of Section 8.of the DAMP.

D. COMMERCIAL FACILITIES

1. Each Permittee shall continue to implement the CAP or equivalent, pursuant to Section 8. of the DAMP and Section XI.A.9 (complaints) of this Order; Section 8 shall be modified to clarify the types of facilities specifically addressed by the CAP. Within 18 months, the Co-Permittees shall also identify any facilities that transport, store or transfer pre-production plastic pellets and managed turf facilities (e.g. private golf courses, athletic fields, cemeteries, and private parks) within their jurisdiction and determine if these facilities warrant additional inspection to protect water quality.
2. The Permittees shall continue to develop BMPs applicable for each of the Commercial Facilities described in Section 8 of the DAMP.
3. The Co-Permittees shall continue to prioritize Commercial Facilities within their jurisdiction as a high, medium, or low threat to water quality based on such factors as the type, magnitude, and location of the commercial activity, proximity and sensitivity of Receiving Waters, potential for discharge of Pollutants to the MS4, Commercial Facilities that handle or generate Pollutants for which the Receiving Water is Impaired, frequency of inspections and facilities with a high potential for or history of unauthorized, Non-storm Water discharges.
4. All high priority Commercial Facilities shall be inspected at least once per year; all medium priority Commercial Facilities shall be inspected at least every two years; and all low priority Commercial Facilities shall be inspected at least once during the

term of this Order. At a minimum, each Commercial Facility shall be required to implement source control and pollution prevention BMPs consistent with the requirements of Section 8 of the DAMP. Co-Permittee follow-up inspections should include a review of BMPs implemented, their effectiveness and maintenance; written and photographic documentation of materials and waste handling and storage practices; evidence of past or present unauthorized, Non-storm Water discharges; and an assessment of management/employees awareness of storm water pollution prevention measures.

5. In the event that inappropriate material or waste handling or storage practices are observed, or there is evidence of past or present unauthorized, Non-storm Water discharges, a written enforcement order shall be issued at the time of the initial inspection for CAP equivalent inspection programs or at the time of the CAP follow-up inspection, to bring the Commercial Facility into compliance.
6. Within 18 months of adoption of this Order, the Co-Permittee shall notify all mobile businesses based within their jurisdiction concerning the minimum Source Control and Pollution Prevention BMPs that they must develop and implement. For purposes of this Order, mobile businesses include: mobile auto washing/detailing; equipment washing/cleaning; carpet, drape, furniture cleaning; and mobile high pressure or steam cleaning activities that are based out of a Co-Permittee's jurisdiction. The mobile businesses shall be required to implement appropriate BMPs within 3 months of being notified by the Co-Permittees. The Co-Permittees shall also notify mobile businesses discovered operating within their jurisdiction.
7. Within 24 months of adoption of this Order, the Co-Permittees shall develop an enforcement strategy to address mobile businesses.
8. The Co-Permittees should continue to maintain the CAP restaurant inspection program, or equivalent. Inspections for Commercial Facilities with restaurants shall, at a minimum, address:
    a. Oil and grease disposal to verify that these wastes are not poured onto a parking lots, streets or adjacent catch basins;
    b. Trash bin areas, to verify that these areas are clean, the bin lids are closed, the bins are not used for liquid waste disposal and wash water from the bins is not disposed of into the MS4;
    c. Parking lot, alley, sidewalk and street areas to verify that floor mats, filters and garbage containers are not washed in those areas and that no wash water is disposed of in those areas;
    d. Parking lot areas to verify that they are cleaned by sweeping, not by hosing down, and that the facility operator uses dry methods for spill cleanup; and,
    e. Violations of the Storm Water Ordinance shall be enforced by the jurisdictional Co-Permittee.

E. RESIDENTIAL PROGRAM

1. Within 18 months of adoption of this Order, each Co-Permittee shall develop and implement a residential program consistent with these requirements to reduce the discharge of Pollutants from residential activities to the MS4, consistent with the MEP standard.
2. The Co-Permittees shall identify residential activities that are potential sources of Pollutants and develop and/or enhance Fact Sheets/BMPs as appropriate. At a minimum, this should include: residential auto washing and maintenance activities; use and disposal of pesticides, herbicides, fertilizers and household cleaners; and collection and disposal of pet wastes. The Permittees shall distribute the Fact Sheets/BMPs and appropriate information from organizations such as the Riverside-Corona Resource Conservation District[44] and USDA's Backyard Conservation Program[45] to the residents to ensure that discharges from the residential areas are not causing or contributing to a violation of Water Quality Standards in the Receiving Waters.
3. The Co-Permittees, collectively or individually, shall facilitate the proper collection and management of used oil, toxic and hazardous materials, and other household wastes. The Permittees should continue distribution of information regarding the dates and locations of temporary and permanent household hazardous waste and antifreeze, oil, battery and paint collection events and facilities, and financial support of household hazardous waste and antifreeze, oil, battery and paint collection facilities and events or curbside or special collection sites managed by the Co-Permittees or private entities, such as solid waste haulers.
4. The Regional Board recommends continuation of Co-Permittee efforts to coordinate with local water purveyors and other stakeholders to encourage efficient irrigation and minimize runoff from residential areas.
5. The Co-Permittees shall enforce their Storm Water Ordinance as appropriate to control the discharge of Pollutants associated with residential activities.
6. Each Co-Permittee shall include an evaluation of its residential program in the Annual Report starting with the second Annual Report after adoption of this Order.

---

[44] The Riverside-Corona Resource Conservation District (RCRCD) provides gardening and horticulture information appropriate for the area including native plant selection, backyard management, alternatives to pesticide, irrigation scheduling and composting. The RCRCD is sponsored by the cities and county of Riverside Only Rain Down the Storm Drain Pollution Prevention Program.

[45] Backyard Conservation, Bringing Conservation from the Countryside to Your Backyard, USDA Natural Resources Conservation Service, National Association of Conservation Districts, Wildlife Habitat Council and National Audubon Society.

XII. NEW DEVELOPMENT (INCLUDING SIGNIFICANT REDEVELOPMENT)

A. GENERAL REQUIREMENTS:

1. Each Co-Permittee, consistent with the DAMP, and requirements of this Order, when considering any map or permit for a New Development or Significant Redevelopment project for which discretionary approval is sought, must continue to require such map or permit to obtain coverage under the General Construction Permit, where applicable, prior to the issuance of grading or construction permits. Each Co-Permittee shall specify its verification procedure and any tools utilized for this purpose in its LIP.

2. Each Co-Permittee must continue to implement those BMPs identified in Section 7.1 of the DAMP. Each Permittee shall ensure that the erosion and sediment control plans it approves include appropriate erosion and sediment control BMPs (i.e., erosion measures for slopes greater than a certain length or hill-side developments, ingress/egress controls, perimeter controls, run-on diversion, if significant) such that a distinct and effective combination of BMPs consistent with site risk is implemented through all phases of construction.

3. The land use approval process of each Co-Permittee must continue to require post-construction BMPs, Source Control BMPs and Treatment Control BMPs and identify their locations and long-term maintenance responsibilities consistent with the requirements of this Order.

4. Each Permittee shall ensure, consistent with the MEP standard and within the limits of its legal authority, that runoff from New Development and Significant Redevelopment projects not regulated under this Order but that require encroachment permits for connections to the MS4 regulated under this Order are consistent with the requirements of this Order including the model WQMP for the Permit Area.
5. Each Permittee shall ensure that appropriate BMPs to reduce erosion and mitigate Hydromodification are included in the design for replacement of existing culverts or construction of new culverts and/or bridge crossings to the MEP[46].
6. Each Permittee shall ensure, consistent with the MEP standard, that runoff from development projects it approves, does not cause nuisance to adjoining downstream properties and stream channels.
7. Each Permittee shall ensure to the MEP that MS4s[47] are appropriately maintained consistent with Section XIV of this Order or are adequately maintained by a legally responsible party.

---

[46] This type of project may require a CWA Section 404 Permit.

8. Each Permittee shall require applicants to minimize the short and long-term adverse impacts on Receiving Water quality from New Development and Significant Redevelopment maps or permits where discretionary approval is sought, as required in Section XII.D below, by: (1) continuing to review, approve, and verify implementation of project-specific WQMPs, implementation of LID principles, where feasible; (2) addressing HCOCs; and (3) ensuring that long term BMP operation and maintenance mechanisms are in place prior to project closure or issuance of certificates of occupancy.

9. The requirements of Section XII.D below shall apply to Permittee projects that meet the New Development and Significant Redevelopment criteria.

10. Each Permittee shall participate in the development of a Watershed Action Plan, described in Section XII.B, below, to integrate water quality, stream protection and storm water management and use within the Permit Area with land use planning policies, ordinances, and plans.

B. WATERSHED ACTION PLAN

1. An integrated watershed management approach may facilitate integration of planning and project approval processes with water quality and quantity control measures. Management of the impacts of Permit Area urbanization on water quality and stream stability is more effectively done on a per-site, neighborhood and municipal basis based on an overall watershed plan. Pending completion of the Watershed Action Plan consistent with this section, management of the impacts of urbanization shall be accomplished using existing programs. The Permittees shall develop a Watershed Action Plan to address the entire Permit Area. The Permittees may choose to develop sub-watershed action plans based on the overall Watershed Action Plan in the future based on new 303(d) impairments, TMDL requirements, or other factors.

2. The Permittees shall develop and submit to the Executive Officer for approval a Watershed Action Plan that describes and implements the Permittees' approach to coordinated watershed management. The objective of the Watershed Action Plan is to address watershed scale water quality impacts of urbanization in the Permit Area associated with Urban TMDL WLAs, stream system vulnerability to Hydromodification from Urban Runoff, cumulative impacts of development on

---

[47] Urban runoff conveyance systems created or resulting from development projects approved by Permittees.

vulnerable streams, preservation of Beneficial Uses of streams in the Permit Area, and protection of water resources, including groundwater recharge areas.

3. Within three years of Permit adoption, the Co-Permittees shall develop the Watershed Action Plan and implementation tools to address impacts of urbanization in a holistic manner. At a minimum, the Watershed Action Plan shall include the following:
   a. Describe proposed Regional BMP approaches that will be used to address Urban TMDL WLAs.
   b. Develop recommendations for specific retrofit studies of MS4, parks and recreational areas that incorporate opportunities for addressing TMDL Implementation Plans, Hydromodification from Urban Runoff and LID implementation.
   c. Description of regional efforts that benefit water quality (e.g. Western Riverside County Multiple Species Habitat Conservation Plan, TMDL Task Forces, Water Conservation Task Forces, Integrated Regional Watershed Management Plans) and their role in the Watershed Action Plan. The Permittees shall describe how these efforts link to their Urban Runoff Programs and identify any further coordination that should be promoted to address Urban WLA or Hydromodification from Urban Runoff to the MEP.
4. Within two years of adoption of this Order, the Permittees shall delineate existing unarmored or soft-armored stream channels in the Permit Area that are vulnerable to Hydromodification from New Development and Significant Redevelopment projects.
5. Within two years of completion of the delineation in Section XII,B.4 above, develop a Hydromodification management plan (HMP) describing how the delineation will be used on a per project, sub-watershed, and watershed basis to manage Hydromodification caused by urban runoff. The HMP shall prioritize actions based on drainage feature/susceptibility/risk assessments and opportunities for restoration.
   a. The HMP shall identify potential causes of identified stream degradation including a consideration of sediment yield and balance on a watershed or sub-watershed basis.
   b. Develop and implement a HMP to evaluate Hydromodification impacts for the drainage channels deemed most susceptible to degradation. The HMP will identify sites to be monitored, include an assessment methodology, and required follow-up actions based on monitoring results. Where applicable, monitoring sites may be used to evaluate the effectiveness of BMPs in preventing or reducing impacts from Hydromodification.

6. Identify Impaired Waters [CWA § 303(d) listed] with identified Urban Runoff Pollutant sources causing impairment, existing monitoring programs addressing those Pollutants, any BMPs that the Permittees are currently implementing, and any BMPs the Permittees are proposing to implement consistent with the other requirements of this Order. Upon completion of XII.B.4, develop a schedule to implement an integrated, world-wide-web available, regional geodatabase of the impaired waters [CWA § 303(d) listed], MS4 facilities, critical habitat preserves defined in the Multiple Species Habitat Conservation Plan and stream channels in the Permit Area that are vulnerable to Hydromodification from Urban Runoff.

7. Develop a schedule to maintain the geodatabase required in Section XII.B.4 and other available and relevant regulatory and technical documents associated with the Watershed Action Plan.

8. Within three years of adoption of this Order, the Watershed Action Plan shall be submitted to the Executive Officer for approval and incorporation into the DAMP. Within six months of approval, each Permittee shall implement applicable provisions of the approved revised DAMP and incorporate applicable provisions of the revised DAMP into the LIPs for watershed wide coordination of the Watershed Action Plan.

9. The Permittees shall also incorporate Watershed Action Plan training, as appropriate, including training for upper-level managers and directors into the training programs described in Section XV. The Co-Permittees shall also provide outreach and education to the development community regarding the availability and function of appropriate web-enabled components of the Watershed Action Plan.

10. Invite participation and comments from resource conservation districts, water and utility agencies, state and federal agencies, non-governmental agencies and other interested parties in the development and use of the Watershed Geodatabase;

C. INCORPORATION OF WATERSHED PROTECTION PRINCIPLES INTO PLANNING PROCESSES

1. Within 24 months of adoption of this Order, each Co-Permittee shall review its General Plan and related documents including, but not limited to its development standards, zoning codes, conditions of approval and development project guidance to eliminate any barriers to implementation of the LID principles and HCOC discussed in Section XII.E of this Order. The results of this review along with any proposed action plans and schedules shall be reported in the Annual Report for the corresponding reporting year. Any changes to the project approval process or procedures shall be reflected in the LIP.

2. The Co-Permittees shall continue to ensure that their General Plan and related land use ordinances and land use approval processes (including, but not limited to, its approved development standards, zoning ordinances, standard conditions of approval, or project development guidelines) ensure the principles and policies enumerated below are properly considered and are incorporated, as appropriate, into the land use approval process to the MEP:
   a. Limit disturbance of natural water bodies and drainage systems; conserve natural areas; protect slopes and channels; minimize significant adverse impacts from Urban Runoff on the biological integrity of natural drainage systems and water bodies;
   b. Minimize changes in hydrology and Pollutant loading; require incorporation of controls including Source Control and Treatment Control BMPs to mitigate any projected increases in Pollutant loads and flows; ensure that post-development runoff rates and velocities from a site do not adversely impact downstream erosion and stream habitat; minimize the quantity of Urban Runoff directed to impermeable surfaces and the MS4; and maximize the percentage of permeable surfaces to allow more percolation of Urban Runoff into the ground;
   c. Preserve wetlands, riparian corridors, and buffer zones that provide important water quality benefits; establish reasonable limits on the clearing of vegetation from the project site;
   d. Encourage the use of BMPs to manage Urban Runoff quantity and quality, consistent with XII.C.1 above;
   e. Provide for appropriate permanent measures to reduce Pollutant loads in Urban Runoff from the development site; and
   f. Establish development guidelines for areas particularly susceptible to erosion and sediment loss.

3. The Co-Permittees, when acting as a CEQA Lead Agency for a project requiring a CEQA document, must identify at the earliest possible time in the CEQA process resources under the jurisdiction by law of the Regional Board which may be affected by the project. The preliminary WQMP should identify the need for any CWA Section 401 certification. The Co-Permitees should coordinate project review with Regional Board staff pursuant to the requirements of CEQA. Upon request by Regional Board staff, this coordination shall include the timely provision of the discharger's identity and their contact information and the facilitation of early-consultation meetings.

4. The following potential impacts shall be considered during CEQA review:
   a. Potential impact of project construction on Urban Runoff.
   b. Potential impact of project's post-construction activity on Urban Runoff.

c. Potential for discharge of Pollutants from areas of material storage, vehicle or equipment fueling, vehicle or equipment maintenance (including washing), waste handling, hazardous materials handling or storage, delivery areas or loading docks, or other outdoor areas.

d. Potential for discharge of Urban Runoff to affect Beneficial Uses of the Receiving Waters.

e. Potential for significant changes in the flow velocity and/or volume of Urban Runoff that could cause environmental harm.

f. Potential for significant increases in erosion of the project site or surrounding areas.

5. Each Permittee shall provide the Regional Board with the draft amendment or revision when a pertinent General Plan element or the General Plan is noticed for comment in accordance with Govt. Code § 65350 et seq.

D. WATER QUALITY MANAGEMENT PLAN (WQMP) FOR URBAN RUNOFF (FOR NEW DEVELOPMENT/ SIGNIFICANT REDEVELOPMENT):

1. Each Permittee shall continue to require project-specific WQMPs for those maps and permits described below for which discretionary approval is sought and as further described in Section 6 and Appendix O of the DAMP. Within 18 months of adoption of this Order, the Permittees shall submit a revised WQMP to incorporate new elements required in this Order. The primary objective of the WQMP, by addressing Site Design, Source Control and Treatment Control BMPs applied on a regional, sub-regional or site specific basis, is to ensure that the land use approval process of each Co-Permittee will minimize Pollutant loads in Urban Runoff from maps or permits for which discretionary approval is given.

2. Each Co-Permittee shall ensure that an appropriate WQMP is prepared for the following categories of New Development and Significant Redevelopment projects for which a map or permit for discretionary approval is sought:

   a. *All significant re-development projects:* Significant re-development is defined as the addition or replacement of 5,000 or more square feet of impervious surface on an already developed site. Significant Redevelopment does not include routine maintenance activities that are conducted to maintain original line and grade, hydraulic capacity, original purpose of the facility, or emergency redevelopment activity required to protect public health and safety. Where redevelopment results in an increase of less than fifty percent of the impervious surfaces of a previously existing developed site, and the existing development was not subject to WQMP requirements, the numeric sizing criteria discussed below applies only to the addition or replacement, and not to the entire developed site.

Where redevelopment results in an increase of fifty percent or more of the impervious surfaces of a previously existing developed site, the numeric sizing criteria applies to the entire development.

b. For purposes of this Order, the categories of development identified below, shall be collectively referred to as "New Development".

   i. New developments that create 10,000 square feet or more of impervious surface (collectively over the entire project site) including commercial and industrial projects and residential housing subdivisions requiring a Final Map. (i.e., detached single family home subdivisions, multi-family attached subdivisions, condominiums, apartments, etc.); mixed use and public projects (excluding Permittee road projects). This category includes development projects on public and private land, which fall under the planning and building authority of the Co-Permittees.

   ii. Automotive repair shops (with SIC codes 5013, 5014, 5541, 7532-7534, 7536-7539).

   iii. Restaurants (with SIC code 5812) where the land area of development is 5,000 square feet or more.

   iv. Hillside developments disturbing 5,000 square feet or more which are located on areas with known erosive soil conditions or where the natural slope is twenty-five percent or more.

   v. Developments of 2,500 square feet of impervious surface or more adjacent to (within 200 feet) or discharging directly into ESAs.

   vi. Parking lots of 5,000 square feet or more exposed to storm water. Parking lot is defined as land area or facility for the temporary parking or storage of motor vehicles.

   vii. Retail Gasoline Outlets (RGOs) that are either 5,000 square feet or more with a projected average daily traffic of 100 or more vehicles per day.

   viii. Emergency public safety projects in any of the above-listed categories may be excluded if the delay caused due the requirement for a WQMP compromises public safety, public health and/or environmental protection.

3. WQMPs shall include BMPs (on-site and/or watershed-based), for the discharge of any urban sourced 303(d) listed Pollutant to an Impaired Waterbody on the 303(d) list such that the discharge shall not cause or contribute to an exceedance of Receiving Water Quality Objectives.

4. Treatment Control BMPs shall be in accordance with the approved WQMP and must be sized to comply with one of the following numeric sizing criteria:

a. VOLUME - Volume–based Treatment Control BMPs shall be designed to infiltrate, filter, or treat either:

   i. The volume of runoff produced from a 24-hour, 85th percentile storm event, as determined from the County of Riverside's 85th Percentile Precipitation Isopluvial Map; or,

   ii. The volume of annual runoff produced by the 85th percentile, 24-hour rainfall event determined as the maximized capture storm water volume for the area, from the formula recommended in Urban Runoff Quality Management, WEF Manual of Practice No. 23/ASCE Manual of Practice No. 87 (1998); or,

   iii. The volume of annual runoff based on unit basin storage volume, to achieve 80% or more volume treatment by the method recommended in California Storm Water Best Management Practices Handbook – Industrial/Commercial (1993); or,

   iv. The volume of runoff, as determined from the local historical rainfall record, that achieves approximately the same reduction in Pollutant loads and flows as achieved by mitigation of the 85th percentile, 24-hour runoff event;

   OR

b. FLOW - Flow-based BMPs shall be designed to infiltrate, filter, or treat either:

   i. The maximum flow rate of runoff produced from a rainfall intensity of 0.2 inch of rainfall per hour; or,

   ii. The maximum flow rate of runoff produced by the 85th percentile hourly rainfall intensity, as determined from the local historical rainfall record, multiplied by a factor of two; or,

   iii. The maximum flow rate of runoff, as determined from the local historical rainfall record that achieves approximately the same reduction in Pollutant loads and flows as achieved by mitigation of the 85th percentile hourly rainfall intensity multiplied by a factor of two.

5. Within 24 months of adoption of this Order, the Permittees shall develop a procedure for streamlining regulatory agency approval of regional Treatment Control BMPs. The recommendations should include information needed to be submitted to Regional Board for consideration of regional Treatment Control BMPs. At a minimum, it should include: BMP location; type and effectiveness in removing Pollutants of Concern; projects tributary to the regional treatment system; engineering design details; funding sources for construction, operation and maintenance; and parties responsible for monitoring effectiveness, operation and maintenance.

6. The Permittees shall continue to require other development projects for which a map or permit for discretionary approval is sought (projects that are not New Developments or Significant Re-developments required to develop project-specific

WQMPs) to incorporate conditions of approval, to require appropriate Site Design, Source Control and any other BMPs which may or may not include Treatment Control BMPs.

7. The Permittees shall ensure that the revised WQMP addresses:
   a. A review and update of Source Control BMPs required for New Development and Significant Redevelopment.
   b. Update of the list of Treatment Control BMPs, including an evaluation of their effectiveness based on national, statewide or regional studies.
8. Groundwater Protection:

   Treatment Control BMPs utilizing infiltration [exclusive of incidental infiltration and BMPs not designed to primarily function as infiltration devices (such as grassy swales, detention basins, vegetated buffer strips, constructed wetlands, etc.)] must comply with the following minimum requirements to protect groundwater:

   a. Use of structural infiltration Treatment Control BMPs shall not cause or contribute to an exceedance of groundwater Water Quality Objectives.
   b. Use of structural infiltration Treatment Control BMPs shall not cause a Nuisance or pollution as defined in Water Code Section 13050.
   c. Use of structural infiltration Treatment Control BMPs shall not be used in areas of known soil or groundwater contamination[48], without written authorization from the Regional Board Executive Officer.
   d. Located at least 100 feet horizontally from any water supply well.
   e. The vertical distance from the bottom of any infiltration structural Treatment Control BMP to the historic high groundwater mark shall be at least 10 feet. Where the groundwater basins do not support Beneficial Uses, this vertical distance criteria may be reduced, provided groundwater quality is maintained.
   f. Source Control and Pollution Prevention BMPs shall be implemented to protect groundwater quality.
   g. Adequate pretreatment of runoff prior to infiltration shall be required in gas stations and large commercial parking lots.
   h. Unless adequate pre-treatment of runoff is provided prior to infiltration, structural infiltration Treatment Control BMPs must not be used for areas of industrial or light industrial activity, such as: areas subject to high vehicular traffic (25,000 or more daily traffic), car washes; nurseries; or any other high threat to water quality land uses or activities.

---

[48] Extra diligence should also be performed when proposing infiltration BMPs in areas where the proposed land use is often associated with soil and groundwater contamination.

i. Class V injection wells or dry wells must not be placed in areas subject to vehicular[49] repair or maintenance activities[50], such as an auto body repair shop, automotive repair shop, new and used car dealership, specialty repair shop (e.g., transmission and muffler repair shop), or any facility that does any vehicular repair work.

E. LOW IMPACT DEVELOPMENT (LID) AND HYDROMODIFICATION MANAGEMENT TO MINIMIZE IMPACTS FROM NEW DEVELOPMENT/SIGNIFICANT REDEVELOPMENT PROJECTS:

1. Within 18 months of adoption of this Order, the Permittees shall update the WQMP to address LID principles and HCOC consistent with the MEP standard. A copy of the updated WQMP shall be submitted to the Executive Officer for approval. Within six months of approval, each Permittee shall implement the updated WQMP. Onsite LID principles as close to Pollution sources as possible shall be given preference, however, project site, sub-regional or regional LID principles may also be applied.

2. The Permittees shall require those projects identified in Section XII.D.2. to infiltrate, harvest and use, evapotranspire and/or bio-treat[51] the 85th percentile storm event ("Design Capture Volume"). The Design Capture Volume should be calculated as specified in Section XII.D.4.a, above. It is recognized that LID principles are not universally applicable and they are dependent on factors such as: soil conditions including soil compaction and permeability, groundwater levels, soil contaminants (Brownfield development), space restrictions (in-fill projects, redevelopment projects, high density development, transit-oriented developments), highest and best use of Urban Runoff (to support downstream uses), etc. Any portion of this volume that is not infiltrated, harvested and used, evapotranspired, and/or bio-treated shall be treated and discharged in accordance with the requirements set forth in Section XII.G, below.

3. The Permittees shall incorporate LID site design principles into the revised WQMP to reduce runoff to a level consistent with the MEP standard. The Co-Permittees

---

[49] Vehicles include automobiles; motor vehicles include trucks, trains, boats, motor cycles, farm machineries, airplanes, and recreation vehicles such as snow mobiles, all terrain vehicles, and jet skis.
[50] United States Environmental Protection Agency, Office of Water, EPA 816-R-00-008, September 2000 *State Implementation Guidance - Revisions to the UIC Regulations for Class V Injection Wells and* "Class V Rule" (*Revisions to the Underground Injection Control Regulations for Class V Injection Wells*, 64 FR 68546) *indicate that these activities are prohibited from Class V injection wells.*

[51] A properly engineered and maintained bio-treatment system may be considered only if infiltration, harvesting and use and evapotranspiration cannot be feasibly implemented at a project site (feasibility criteria will be established in the WQMP [Section XII.G.1]. Specific design, operation and maintenance criteria for bio-treatment systems shall be part of the WQMP that will be produced by the Permittees.

shall require that New Development and Significant Redevelopment projects include Site Design BMPs during the development of the project-specific WQMP. The design goal shall be to maintain or replicate the pre-development hydrologic regime through the use of design techniques that create a functionally equivalent post-development hydrologic regime through site preservation techniques and the use of integrated and distributed infiltration, retention, detention, evapotranspiration, filtration and treatment systems. The revised WQMP should continue to consider Site Design BMPs described in Appendix O of the DAMP and LID principles described in the pending Southern California Stormwater Monitoring Coalition/CASQA *LID Guidance Manual for Southern California*.

4. Within 18 months of adoption of this Order, each Permittee shall revise, where feasible its ordinances, codes, building and landscape design standards to promote green infrastructure/LID techniques including, but not limited to, the following:

   a. Landscaping designs that promote longer water retention and evapotranspiration such as 1 foot depth of compost/top soil in commercial and residential areas on top of 1 foot of non-compacted subsoil, concave landscape grading to allow runoff from impervious surfaces, and water conservation by selection of water efficient native plants, weather-based irrigation controllers, etc.

   b. Allow permeable surface designs in low traffic roads and parking lots. This may require land use/building code amendment.

   c. Allow natural drainage systems for street construction and catchments (with no drainage pipes) and allow vegetated ditches and swales where feasible.

   d. Require landscape in parking lots to provide treatment, retention or infiltration.

   e. Reduce curb requirements where adequate drainage, conveyance, treatment and storage are available.

   f. Amend land use/building codes to allow no curbs, curb cuts and/or stop blocks in parking areas and residential streets with low traffic.

   g. Use of green roof, rain garden, and other green infrastructure in urban/suburban area.

   h. Allow rainwater harvesting and use.

   i. Narrow streets provide alternatives to minimum parking requirements, etc. to facilitate LID where acceptable to public safety departments.

j. Consider vegetated landscape for storm water treatment as an integral element of streets, parking lots, playground and buildings.

k. Consider and facilitate application of landform grading techniques[52] and revegetation as an alternative to traditional approaches, particularly in areas susceptible to erosion and sediment loss such as hillside development projects,

l. Other site design BMPs identified in the WQMP not included above.

5. Consistent with the requirements of AB 1881, each Co-Permittee is mandated to update its landscape ordinance. The bill requires the local agencies to adopt the State Model Water Efficient Landscape Ordinance[53] or prepare one that is "at least as effective" as the State Model by January 2010. The proposed state model ordinance applies to landscape requiring a building or landscape permit, plan check or design review. Each Permittee shall provide the Regional Board a copy of its report to Department of Water Resources (DWR).

6. Each Permittee shall implement effective education programs to educate property owners to use Pollution Prevention BMPs and to maintain on-site hydrologically functional landscape controls.

7. To reduce Pollutants in Urban Runoff, address Hydromodification, and manage Urban Runoff as a resource to the MEP, the revised WQMP shall specify preferential use of Site Design BMPs that incorporate LID techniques, where feasible, in the following manner (from highest to the lowest priority):

   a. Preventative measures (these are mostly non-structural measures, e.g., preservation of natural features to a level consistent with the MEP standard; minimization of Urban Runoff through clustering, reducing impervious areas, etc.) and

   b. Mitigation measures (these are structural measures, such as, infiltration, harvesting and use, bio-treatment, etc.).

8. The mitigation or structural Site Design BMPs shall also be prioritized (from highest to lowest priority):

   a. Infiltration BMPs (examples include permeable pavement with infiltration beds, dry wells, infiltration trenches, surface and sub-surface infiltration basins. The Permittees should work with local groundwater management agencies to ensure that infiltration Treatment Control BMPs are designed appropriately;

---

[52] http://www.epa.gov/Region3/mtntop/pdf/appendices/d/aquatic-ecosystem-enhanc-symp/symposiumfinal.pdf

[53] http://www.owue.water.ca.gov/docs/final_reg_text.pdf

b. BMPs that harvest and use (e.g., cisterns and rain barrels); and

c. Vegetated BMPs that promote infiltration and evapotranspiration including bioretention, biofiltration and bio-treatment. Upon the Permittees' determination of LID infeasibility per Section XII.G, design capture volume specified in Section XII.D.4, that is not addressed by onsite or offsite LID *Site Design BMPs* as listed above shall be treated using *Treatment Control BMPs* as described in Section XII.G.

9. Hydrologic Condition of Concern (HCOC):

a. The Permittees shall continue to ensure, consistent with the MEP standard, through their review and approval of project-specific WQMPs that New Development and Significant Redevelopment projects do not pose a HCOC due to increased runoff volumes and velocities.

b. A New Development and Significant Redevelopment project does not cause a HCOC if any one of the following conditions is met:

i) The project disturbs less than one acre and is not part of a common plan of development.

ii) The volume and the time of concentration[54] of storm water runoff for the post-development condition is not significantly different from pre-development condition for a 2-year return frequency storms (a difference of 5% or less is considered insignificant). This may be achieved through Site Design and Treatment Control BMPs.

iii) All downstream conveyance channels to an adequate sump (e.g. Prado Dam, Lake Elsinore, Canyon Lake, Santa Ana River or other lake, reservoir or natural resistant feature) that will receive runoff from the project are engineered and regularly maintained to ensure design flow capacity, and no sensitive stream habitat areas will be affected; or not identified in the Permittees Hydromodification sensitivity maps required in Section XII.B.3, and no sensitive stream habitat areas will be affected.

iv) The Permittees may request a variance from these criteria based on studies conducted by the Southern California SMC, SCCWRP, CASQA, or other regional studies. Requests for consideration of any variances should be submitted to the Executive Officer.

c. If a HCOC exists, the WQMP shall include an evaluation of whether the project will adversely impact downstream erosion, sedimentation or stream habitat. This evaluation should include consideration of pre- and post-development hydrograph volumes, time of concentration and peak discharge velocities for a

---

[54] Time of concentration is defined as the time after the beginning of rainfall when all portions of the drainage basin are contributing simultaneously to flow at the outlet.

2-year storm event, construction of sediment budgets, and a sediment transport analysis. If the evaluation determines adverse impacts are likely to occur, the project proponent shall implement additional Site Design BMPs, on-site BMPs, Treatment Control BMPs and/or in-stream BMPs[55] to mitigate the impacts. The project proponent should first consider Site Design BMPs and on-site BMPs prior to proposing in-stream BMPs; in-stream BMPs must not adversely impact Beneficial Uses or result in sustained degradation of Receiving Water quality and shall require all necessary regulatory approvals[56]:

d. HCOC are considered mitigated if they meet one of the following conditions:

   i. Require additional onsite or offsite mitigation to address potential erosion or habitat impact using LID BMPs.

   ii. The project is developed consistent with an approved Watershed Action Plan that addresses HCOC for the downstream Receiving Waters.

   iii. Mimicking the pre-development hydrograph with the post-development hydrograph, for a 2-year return frequency storm. Generally, the hydrologic conditions of concern are not significant, if the post-development hydrograph is no more than 10% greater than pre-development hydrograph. In cases where excess volume cannot be infiltrated or captured and reused, discharge from the site must be limited to a flow rate no greater than 110% of the pre-development 2-year peak flow.

e. If site conditions do not permit items i, through iv, above, the alternatives and in-lieu programs discussed under Section XII.G, below, may be considered.

F. ROAD PROJECTS

1. Within 24 months of adoption of this Order, the Co-Permittees shall develop standard design and post-development BMP guidance to be incorporated into projects for streets, roads, highways, and freeway improvements, under the jurisdiction of the Co-Permittees to reduce the discharge of Pollutants from the projects to the MEP. The draft guidance shall be submitted to the Executive Officer for review and approval and shall meet the performance standards for site design/LID BMPs, Source Control and Treatment Control BMPs as well as the

---

[55] In-stream measures involve modifying the receiving stream channel slope and geometry so that the stream can convey the new flow regime without increasing the potential for erosion and aggradation. In-stream measures are intended to improve long-term channel stability and prevent erosion by reducing the erosive forces imposed on the channel boundary.

[56] In-stream control projects require a Stream Alteration Agreement from the California Department of Fish & Game, a CWA section 404 permit from the U.S. Army Corps of Engineers, and a section 401 certification from the Water Board. Early discussions with these agencies on the acceptability of an in-stream modification are necessary to avoid project delays or redesign.

HCOC criteria. The guidance and BMPs shall address streets, roads or highways under the jurisdiction of the Co-Permittees used for transportation of automobiles, trucks, motorcycles, and other vehicles, and excludes routine road maintenance activities where the surface footprint is not increased. The guidance shall incorporate principles contained in the USEPA guidance, "Managing Wet Weather with Green Infrastructure: Green Streets" to the MEP and at a minimum shall include the following:

a. Guidance specific to new road projects;

b. Guidance specific to projects for existing roads;

c. Size or impervious area criteria that trigger project coverage;

d. Preference for green infrastructure approaches wherever feasible;

e. Criteria for design and BMP feasibility analyses on a project-specific basis.

2. Within six months of approval by the Executive Officer, the Permittees shall implement the standard design and post-development BMP guidance for all road projects. Pending approval of the standard design and post-development BMP guidance, site specific WQMPs for streets road and highway projects shall be required pursuant to Section XII.D.2.

G. ALTERNATIVES AND IN-LIEU PROGRAMS

1. Within 18 months of adoption of this Order, the Permittees shall develop technically-based feasibility criteria for project evaluation to determine the feasibility of implementing LID BMPs which may include factors such as a groundwater protection assessment to determine if infiltration BMPs are appropriate for the site[57]. These criteria shall be submitted to the Executive Officer for approval. Only those projects that have completed a feasibility analysis as per the approved criteria should be considered for alternatives and in-lieu programs. If a particular BMP is not technically feasible, other BMPs should be implemented to achieve the same level of compliance, or if the cost of BMP implementation greatly outweighs the Pollution control benefits, the Co-Permittees may grant a waiver of the BMPs. All waivers, along with waiver justification documentation, must be submitted to the Executive Officer for approval in writing within 30 days prior to Permittee approval.

---

[57] Such feasibility determinations may be based on regional analyses conducted by the Permittees (see finding G-14) or on site specific conditions. Site specific determinations shall be certified by a Professional Civil Engineer registered in the State of California, and will be documented in the project WQMP, which shall be approved by the Permittee prior to submittal to the Executive Officer. Within 30 days of submittal to the Executive Officer, the Permittee will be notified if the Executive Officer intends to take any action.

If a waiver is granted, the Permittees shall ensure that project proponents participate in one of the in-lieu programs discussed in this section.

2. The Permittees may collectively or individually propose to establish an Urban Runoff fund to be used for urban water quality improvement projects within the same watershed that is funded by contributions from developers granted waivers. The contributions should be at least equivalent to the cost savings for waived projects and the urban runoff funds shall be expended for projects that provide at least an equivalent amount of water quality improvement (there shall be no net impact on water quality due to a waived project). If a waiver is granted and an Urban Runoff fund is established, the Annual Report for the year should include:
   a. Total amount deposited into the funds; and
   b. The party responsible for managing the Urban Runoff fund;
   c. Projects funded or proposed to be funded with monies from the urban runoff fund with details on expected water quality improvement;
   d. Party or parties responsible for designing, construction, operation and maintenance of urban runoff funded projects, and
   e. Current status and a schedule for project completion.
3. The obligation to install Treatment Control BMPs at a New Development or Significant Redevelopment project is met if, for a common plan of development, BMPs are constructed with the requisite capacity to serve the entire common project, even if certain phases of the common project may not have BMP capacity located on that phase in accordance with the requirements specified above. The goal of the WQMP is to develop and implement practicable programs and policies to minimize the effects of urbanization on site hydrology, Urban Runoff flow rates, velocities, duration and time of concentration and Pollutant loads. This goal may be achieved through watershed-based Treatment Control BMPs, in combination with site-specific BMPs. All Treatment Control BMPs should be located as close as possible to the Pollutant sources, should not be located within Waters of the US, and Pollutant removal should be accomplished prior to discharge to Waters of the US. Regional Treatment Control BMPs shall be operational prior to occupation of any of the New Development or Significant Redevelopment project sites tributary to the regional Treatment Control BMP.
4. The Permittees may establish, where feasible and practicable, a water quality credit system for alternatives to infiltration, harvesting and use, evapotranspiration and other LID and Hydromodification requirements specified above. The following types of projects may be included in this credit system:
   a. Redevelopment projects that reduces the overall impervious area
   b. Brownfield redevelopment

c. High density developments (>7 units per acre)
d. Mixed use and transit-oriented development (within ½ mile of transit)
e. Dedication of undeveloped portions of the project site to parks, preservation areas and other pervious uses
f. Regional treatment systems with a capacity to treat flows from all upstream developments
g. Offsite mitigation or dedicated mitigation areas within the same watershed
h. Highly urbanized areas such as city center area
i. Historic Districts and Historic Preservation areas
j. Live-work developments
k. In-fill projects
l. Projects that enhance the transport of coarse sediment to the coast for beach replenishment.

5. The water quality credit system should not result in a net impact on water quality.

6. A summary of waivers of LID (along with a short description of the Section XII.G.2 through XII.G4 In-Lieu program selected), Hydromodification and Treatment Control BMPs along with any water quality credit granted, in-lieu projects, or urban runoff fund contribution required by each Co-Permittee shall be included in the Annual Report.

H. APPROVAL OF WQMP

Within 18 months of adoption of this Order, each Permittee shall develop and implement standard procedures and tools and include in its LIP the following:

1. The Permittees shall utilize a mechanism for review and approval of WQMPs, including a checklist that incorporates the minimum requirements of the model WQMP. The process for review and approval shall be described in the Permittees LIP.
2. The Co-Permittees shall maintain a database to track structural post-construction BMPs (consistent with XII.K.4 below).
3. Continue to ensure that the entity(ies) responsible for BMP maintenance and the mechanism for BMP funding is identified prior to WQMP approval.
4. The Permittees shall train those involved with WQMP reviews in accordance with Section XV, Training Requirements.

I. FIELD VERIFICATION OF BMPS

1. The Co-Permittees' permit close-out procedures shall include field verification that structural Site Design, Source Control and Treatment Control BMPs are designed, constructed and functional in accordance with the approved WQMP.
2. Prior to occupancy, the Co-Permittees shall verify through visual observation that the BMPs are working and functional.
3. The Co-Permittees may accept self-certification or third-party certification of BMPs from State-licensed professional engineers.

J. CHANGE OF OWNERSHIP AND RECORDATION

The Co-Permittees shall establish a mechanism to ensure that appropriate easements and ownerships are properly recorded in public records at the County and/or the city and the information is conveyed to all appropriate parties when there is a change in project or site ownership.

K. OPERATION AND MAINTENANCE OF POST-CONSTRUCTION BMPS

1. The Co-Permittees shall ensure that structural post construction BMPs are designed and implemented with control measures necessary to effectively minimize the creation of Nuisance or Pollution associated with vectors, such as mosquitoes, rodents, flies, etc. The Co-Permittee should work with the local vector agencies to ensure that structural post construction BMPs are designed to minimize the potential for vector breeding during operation and maintenance.
2. The Co-Permittees shall specify conditions of approval and as built inspections ensure that require proper maintenance and operation of any structural post construction BMPs including requirements for vector control.
3. The parties responsible for the maintenance and operation of the structural post construction BMPs, and a funding mechanism for operation and maintenance of structural post construction BMPs for the life of the project shall be identified prior to issuance of occupancy permits. Design of these structures shall allow adequate access for maintenance.
4. Each Co-Permittee shall maintain a database to track the operation and maintenance of the structural post construction BMPs installed after adoption of this Order. The database shall include: type of BMP; watershed where it is located; date of certification; party responsible for maintenance and any problems identified during inspection including any vector or nuisance problems.
5. Within 18 months of adoption of this order and annually thereafter, all Permittee-owned structural post construction BMPs installed after the date of this Order shall be inspected prior to the Rainy Season. The Co-Permittees shall also develop an

inspection frequency for New Development and Significant Redevelopment projects, based on the project type and the type of structural post construction BMPs deployed. Pursuant to XII.K.4, all New Development and Significant Redevelopment, structural post construction BMPs shall be inspected within the five-year Permit Term. The Co-Permittees shall ensure that the BMPs are operating and are maintained properly and all BMPs are working effectively to remove Pollutants in runoff from the site. If vector problems are identified, the Co-Permittees should work with the vector control agencies to remedy vector control problems. All inspections shall be documented and kept as Permittee record. The Co-Permittees may accept inspection reports conducted and certified by state licensed professional engineers in lieu of Co-Permittee inspections.

6. The Annual Report shall include a list of all structural post construction BMPs approved contained in the database required in XII.K.4 above.

L. PRE-APPROVED PROJECTS

The above provisions for LID and HCOC are not applicable to projects that have an approved WQMP as of the date of approval of the revised WQMP. The above provisions shall be implemented in a manner consistent with the MEP standard for all other projects 45 days from the date of approval of the revised WQMP. The Regional Board recognizes that full implementation may not be feasible for certain projects which have received tentative tract or parcel map or other discretionary approvals.

XIII. PUBLIC EDUCATION AND OUTREACH

A. The Permittees shall continue to implement the public education efforts already underway and shall continue to promote the most effective elements of the comprehensive public and business education strategy contained in the ROWD and Section 10 of the DAMP. As part of the Annual Report, the Permittees shall review their public education and outreach efforts and revise their activities to adapt to the needs identified in the annual reassessment of program priorities with particular emphasis on addressing the Pollutants of Concern. Results of this review shall direct the focus of its public education effort and cause recommendations for any changes to the public and business education program including: (1) how to make the multimedia efforts more effective; (2) a reevaluation of audiences and key messages for targeted behaviors; and (3) opportunities for participation in regional and statewide public education efforts. The goal of the public and business education program shall be to target 100% of the residents, including businesses, commercial and industrial establishments.

B. A status report on the requirements of this section and any changes to the on-going public education program shall be described in the Annual Report.

C. The Permittees shall implement an assessment program to measurably increase public knowledge of its communities regarding MS4 and impacts of Urban Runoff on Receiving Waters. The Permittees shall implement programs that can measure the change in behavior of its target communities to reduce Pollutant releases to the MS4 and the environment. A description of the program tasks, schedule and measurable goals shall be included in the first Annual Report due after adoption of this Order.

D. When feasible, the Permittees shall participate in joint outreach programs with other agencies including, but not limited to, the Santa Ana Watershed Project Authority, Caltrans, and other county and municipal storm water programs to ensure that a consistent message on storm water pollution prevention is disseminated to the public.

E. The Permittees shall continue to ensure that appropriate outreach materials are available for construction, industrial and commercial inspection programs. Outreach materials should be provided to Permittee inspectors for distribution to inspected facilities.

F. Within 18 months from the date of adoption of this Order, the Permittees shall ensure that they have developed, maintained and distributed BMP guidance for the control of those potentially polluting activities identified during the term of the 2002 MS4 Permit, which are not otherwise regulated by any agency, including guidelines for the household use of fertilizers, pesticides, herbicides and other chemicals, and guidance for mobile vehicle maintenance, carpet cleaners, commercial landscape maintenance, and pavement cutting. These guidance documents shall be distributed to the public, trade associations, etc., through participation in community events, trade association meetings and/or by mail.

G. The Permittees shall ensure that appropriate educational materials, including the BMP brochures, are provided to all new industrial and commercial enterprises within their jurisdiction at the time appropriate permits (e.g. business licenses or occupancy permits) are issued.

H. The Permittees shall continue to maintain, and if necessary enhance, public education materials to encourage the public to report: Illegal Dumping and unauthorized, non-storm water discharges from residential, industrial, construction and commercial sites into public streets, storm drains and to surface waterbodies and their tributaries; clogged storm drains; and faded stencils or missing catch basin markers. The Principal Permittee's hotline and web site shall provide guidance regarding where to locate information regarding general Urban Runoff pollution control measures. The hotline and website information shall be included in outreach materials and shall be listed in the governmental pages of prominent regional phone books and on the Co-Permittees' website.

I. The Permittees shall maintain a Public Education Committee to provide oversight and guidance for the implementation of the public education program. The Permittees shall

continue to participate in the Public Education Committee to review and update existing guidance for the implementation of the public education program. One of the functions of the Public Education Committee shall be to review outreach materials for construction, industrial and commercial inspection programs and residential outreach to ensure they appropriately address common violations observed during inspections. Once deficiencies are identified, alternative text to address the deficiency shall be developed within 6 months and reported in the Annual Report. The Public Education Committee shall meet at least twice per year.

J. The Permittees shall continue to sponsor or staff a table or booth at community, regional, and/or countywide events to distribute public education materials related to Urban Runoff pollution prevention to the public. Each Permittee shall participate in at least one event per year.

K. Successful implementation of the provisions and limitations in this Order will require the cooperation of all the public agency organizations within Riverside County having programs/activities that have an impact on Urban Runoff quality. This may include, but not be limited to, those listed in Appendix 2. As such, the Permittees should coordinate their efforts with those organizations where feasible and appropriate to ensure participation in implementing the requirements of this Order. The Permittees should notify the Regional Board where assistance is needed improving local cooperation.

L. Within 18 months of adoption of this Order, each Permittee shall develop BMP Fact Sheets for mobile businesses for distribution consistent with the requirements of Section XI.D.6. At a minimum, the mobile business Fact Sheets/training program should include: laws and regulations dealing with Urban Runoff and discharges to MS4; appropriate BMPs and proper procedures for disposing of Wastes generated from each mobile business category.

M. The Principal Permittee shall continue to develop and distribute BMP guidance for Permittee and contract field operations and maintenance staff to provide guidance in appropriate Pollution Prevention measures, how to respond to spills and reports of Illegal Discharges, etc.

XIV. PERMITTEE FACILITIES AND ACTIVITIES

A. Each Permittee shall continue to implement measures to ensure that their facilities and activities do not cause or contribute to a Pollution or Nuisance in Receiving Waters, as defined in Section 13050 of the Water Code. The Permittees must annually review their activities and facilities to determine the need for revisions to Section 5 of the DAMP and to their LIP. The Annual Report shall include the findings of this review and a schedule for any needed revisions. The Permittees should continue to use Facility Pollution Prevention Plans as noted in Chapter 5 of the DAMP to ensure that the Permittee facilities are not sources of Pollutants to the Waters of the US to the MEP.

B. Within 12 months of adoption of this Order, each Permittee shall review its inventory of fixed facilities listed in the DAMP, its field operations and MS4 facilities to ensure that Permittee facilities and activities are addressed by Facility Pollution Prevention Plans consistent with Chapter 5 of the DAMP and do not cause or contribute to a Pollution or Nuisance in Receiving Waters. Existing Facility Pollution Prevention Plans shall be reviewed to insure proper BMPs for these facilities. For Permittee facilities and/or activities tributary to CWA Section 303(d) Impaired Water Bodies that generate Pollutants for which the water body is Impaired, additional Pollutant-specific Source Control BMPs to target that Pollutant shall be identified and implemented in the Facility Pollution Prevention Plan to the MEP.

C. Each Permittee shall conduct inspections of its fixed facilities and field operations identified in Chapter 5 of the DAMP annually to ensure that they do not contribute Pollutants to Receiving Waters. The Permittees shall record the findings in the inspection forms developed by the Permittees. Each Permittee shall implement BMPs to manage the application, storage, and disposal of pesticides, herbicides, and fertilizers associated with their facilities and activities. At a minimum, the Facility Pollution Prevention Plans for these facilities and activities shall:

1. Ensure that Permittee applicators (including contractors) and distributors have appropriate training, permits, and certifications;
2. Utilize integrated pest management measures that rely on non-chemical solutions, to the extent practicable;
3. Promote the use of native vegetation into facility landscaping;
4. Include schedules for irrigation and chemical application to the extent feasible; and
5. Collect and properly dispose of unused pesticides, herbicides, and fertilizers.
6. The following BMP fact sheets are identified as minimum BMPs::
   i. SC-35/SC-61, Safer Alternative Products
   ii. SC-41, Building & Grounds Maintenance
   iii. SC-60, Housekeeping Practices
   iv. SC-73, Landscape Maintenance

D. Each Permittee shall review, update, and implement the individual clean out schedules and frequency for its MS4, including open channels, catch basins, retention/detention facilities and wetlands created for Urban Runoff treatment during the Wet and Dry Season to protect Receiving Water quality consistent with the MEP standard. The inspection and cleaning frequency for all portions of the specified MS4 shall be included in each Permittee's LIP and shall be evaluated annually to determine the need for adjusting the inspection and cleaning frequency. Each Permittee must clean those MS4 facilities where there is evidence of Illegal Discharge. In addition, each Permittee must clean those retention/detention basins and MS4 where the inspection reveals that the storage

volume is about 25% full or if accumulated sediment or debris impairs the hydraulic capacity of the facility.

E. Unless otherwise supported by field information, each Permittee shall at a minimum inspect, clean, and maintain at least 80% of its open channels, catch basins, retention/detention basins, and wetlands created for Urban Runoff treatment on an annual basis, with 100% of the facilities in a two year period. The MS4 clean out schedule shall continue to be included in the Annual Report.

F. Each Permittee shall examine opportunities to retrofit existing MS4 facilities with water quality protection measures, where feasible.

G. PERMITTEE COMPLIANCE WITH GENERAL PERMITS

1. GENERAL CONSTRUCTION PERMIT

a. All Permittee Construction Sites shall be in compliance with the latest adopted version of the General Construction Permit.

b. This Order authorizes the discharge of storm water runoff from Permittee Construction Sites that may result in land disturbance consistent with the acreage criteria of the General Construction Permit.

c. Prior to commencement of construction activities, the Permittees shall notify the Executive Officer of the proposed Construction Site by submitting a NOI, or Permit Registration Documents (PRDs) as provided in Attachment 5, and a location map depicting the Construction Site location. The filing fees for these NOIs/PRDs are waived for the Permittees.

d. Upon completion of the construction project, the Executive Officer shall be notified of the completion of the project by submitting (1) A Notice of Termination (NOT), provided in Attachment 5. (2) Photographs of the completed project; (3) A site map (depicting the project location and the locations of structural post-construction BMPs, including the latitude and longitude if appropriate); and (4) copies of the final field verification reports required under Section XII.I.

e. The Permittees shall develop, approve, and implement a WQMP for Permittee projects that meet the requirements of Section XII.D. of this Order.

f. The Permittees shall develop and implement a SWPPP and the monitoring and reporting program for their construction projects that meet the requirements of the latest version of the General Construction Permit. The Permittee must review and approve SWPPPs prepared by their contractors.

g. The Permittees shall give advance notice to the Executive Officer of planned changes in the construction activity, which may result in non-compliance with the latest version of the General Construction Permit.

h. Emergency Permittee projects required to protect public health and safety are exempted from compliance with the requirements of this subsection until the emergency ends, at which time they need to comply with the requirements of this section.

2. GENERAL DE-MINIMUS PERMIT DISCHARGES

a. The Permittees are authorized to discharge de-minimus types of discharges listed under the latest adopted version of the Regional Board's General De Minimus Discharge Permit, currently Order No. R8-2009-0003. The de-minimus discharges from Permittee owned and/or operated facilities and/or activities shall be in compliance with Order No. R8-2009-0003 except that the Permittees need not pay the filing fee.

b. The Permittees shall notify the Executive Officer of the proposed discharge at least 15 days prior to start of the discharge, by submitting a NOI and supporting documents, as provided in Attachment 7.

c. For existing Permittee Dischargers (authorized to discharge under Order No. R8-2009-003 prior to the adoption date of this Order), discharges will continue to be regulated under the terms and conditions of Order No. R8-2003-0003 until a new discharge authorization is issued, provided that the Discharger submits, by June 10, 2010, an updated NOI, a copy of the current Monitoring & Reporting Program previously issued to the Discharger, and proposed treatment modifications (if any). If no application for continued discharges are submitted by that date, the Discharger shall do one of the following:

i. Cease discharge and submit a letter informing the Regional Board that coverage under Order R8-2009-003 is no longer needed; or

ii. Apply for new discharge authorization as a new de-minimus discharge, under this Order.

XV. TRAINING PROGRAM FOR STORM WATER MANAGERS, PLANNERS, INSPECTORS AND MUNICIPAL CONTRACTORS

A. Within 24 months of adoption of this Order, the DAMP and each Permittee's LIP shall be updated to include a program to provide formal and where necessary, informal training to Permittee staff that implement the provisions of this Order. Formal training must be implemented as described herein and may consist of regional training provided by the Permittees or individual Co-Permittee training provided in-lieu of Principal Permittee training. Informal training (i.e. tailgate training) shall be implemented by each Permittee on an as-needed basis to supplement the formal

training. Each Permittee shall maintain a written and/or electronic record of stormwater training provided to its storm water and related program staff.

B. The training programs should be coordinated with the local Vector Control District to ensure that vector control issues related to post-construction BMPs maintenance and operation are incorporated into the training curriculum.

C. **Formal Training**: The formal training programs shall educate Permittee employees responsible for implementing requirements of this Order, by providing training on the following Permittee activities: construction site inspection, WQMP review, residential/industrial/commercial site inspection, and Permittee facility maintenance. Formal training may be conducted in classrooms or using videos, DVDs or other multimedia. The program shall consider all applicable Permittee staff such as storm water program managers, construction/industrial/ commercial/residential inspectors, planners, engineers, public works crew, etc. and shall: define the required knowledge and competencies for each Permittee compliance activity, outline the curriculum, include testing or other procedures to determine that the trainees have acquired the requisite knowledge to carry out their duties, and provide proof of completion of training such as Certificate of Completion, and/or attendance sheets. The formal training curriculum shall:

1. Highlight the potential effects that Permittee or Public activities related to their job duties can have on water quality.
2. Overview the principal applicable water quality laws and regulations that are the basis for the requirements in the DAMP.
3. Discuss the provisions of the DAMP that relate to the duties of the target audience, including but not limited to:
   a. The requirements of the DAMP regarding Storm Water Ordinances, resolutions, codes, and standards that relate to the duties of the target audience, including enforcement thereof;
   b. Overview of CEQA requirements contained in Section XII.C of this Order.
   c. Implementation and assessment of SWPPPs and Facility Pollution Prevention Plans relative to the duties of the target audience;
   d. Selection, implementation and maintenance of appropriate BMPs relative to the duties of the target audience;
   e. Tools, checklists and procedures included in the DAMP to assist in implementing the requirements of this Order relative to the duties of the target audience.

D. **Informal Training:** The informal training shall ensure that staff have the requisite knowledge to implement the applicable provisions in the Permittee's LIP, such as (but not limited to):

1. The requirements of local Storm Water Ordinances, resolutions, codes, and standards that relate to the duties of the target audience;
2. Local tools, checklists and/or procedures to implement the requirements of this Order relative to the duties of the target audience.
3. The proper use and maintenance of erosion and sediment controls;
4. Vector control issues related to storm water pollution control BMPs.

E. **Reporting**: Formal training shall be summarized and documented in the Annual Reports.

F. **Schedule**: At a minimum, the training schedule should include the following:

1. New Permittee employees responsible for implementing requirements of this Order must receive informal training within six months of hire and formal training within one year of hire.
2. Permittee facility maintenance staff must receive formal training at least once every two years.
3. Permittee inspection and code enforcement (if applicable) employees must receive formal or informal refresher training focused on appropriate BMP implementation at least once a year prior to the rainy season.
4. Other existing Permittee employees responsible for implementing the requirements of this Order must receive formal training at least once during the term of this Order.
5. The start date for training programs described in this Section shall be included in the schedule required in Section III.A.1.q, but shall be no later than six months after Executive Officer approval of DAMP updates applicable to the Permittee activities described in Section XIV.

G. The Permittees shall require verification of BMP training from contract staff where applicable.

H. The Permittee(s) shall include designated Regional Board staff on training notification e-mails announcing upcoming formal training sessions.

XVI. NOTIFICATION REQUIREMENTS

A. Within 24 hours of discovery, the Permittees shall provide oral or email notification to Regional Board staff of events within its jurisdiction that are determined to be an Emergency Situation. Following oral notification, a written report must be submitted within 10 days of receipt of notice of the Emergency Situation, detailing the nature of the non-compliance, any corrective action taken by the site/facility owner, other relevant information (e.g., past history of the Emergency Situation, environmental damage resulting from the Emergency Situation, site/facility owner responsiveness) and the type of enforcement, consistent with Section 4 of the DAMP, that will be carried out by the Co-Permittee. Further, incidences of noncompliance shall be

recorded along with the information noted in the written report and the final outcome/enforcement for the incident in the databases for Construction Sites, and Industrial or Commercial Facility inspections, as appropriate.

B. Notification requirements for non-Emergency Situations that are discovered during the course of Construction Site and Industrial Facility inspections that may be a violation of the General Stormwater Permits are addressed in Sections XI.A.7 of this Order.

C. Sewage spill notification shall be consistent with the timelines specified in the Statewide General Waste Discharge Requirements for Sanitary Sewer Systems, Water Quality Order No. 2006-0003-DWQ.

D. All reportable quantities of Hazardous Waste spills as per 40CFR 117 and 302 shall be reported within 24 hours. All spill incidents shall be also included in the Annual Report. These requirements are consistent with the Notification requirements for IC/IDs that are addressed in Section IX.B of this Order.

E. Enforcement requirements for Construction Sites and Industrial Facilities operating without an applicable General Stormwater Permit are specified in Section XI.A.7. These Sites and Facilities shall be reported within 14 calendar days to Regional Board staff by electronic mail or other written means. Permittees' notifications of facilities' failure to obtain required coverage under the General Construction Permit, or General Industrial Permit, including requirements to file PRDs. A PRD, NOI, No Exposure Certification, Notice of Non-applicability, and/or 401 Certification must include, at a minimum, the following documentation:

1. Name of the Site or Facility
2. Operator of the Site or Facility
3. Owner of the Site or Facility
4. Construction or Commercial/Industrial activity being conducted at the Site or Facility that is subject to the General Construction Permit, General Industrial Permit or 401 Certification
5. Records of communication with the facility operator regarding the violation, which must include at least an inspection report.

F. The Permittees shall report to the Executive Officer:

1. Any enforcement actions and known discharges of Urban Runoff to MS4 facilities, known to the Permittees, which may have an impact on human health or the environment consistent with Sections XI.A and XI.B above; if the discharge is to Canyon Lake or any tributary to Canyon Lake, Elsinore Valley Municipal Water District shall also be notified immediately; and
2. Any suspected or reported activities on federal, state, or other entity's land or facilities, where the Permittees do not have any jurisdiction, and where the suspected or reported activities may be contributing Pollutants to Waters of the US

XVII. PROGRAM MANAGEMENT ASSESSMENT/DAMP REVIEW

A. By November 30 of each year, the Permittees shall evaluate the effectiveness of the Urban Runoff management program described in the DAMP to determine the need for any revisions in order to reduce Pollutants in MS4 discharges consistent with the MEP standard consistent with the reporting requirements in Appendix 3, Section IV.B. In addition, the first Annual Report (November 2010) after adoption of this Order shall include the following:

1. Review of the formal training needs of Permittee employees.
2. Review of coordination meeting/training for the designated NPDES inspectors.
3. Proposal for assessment of Urban Runoff management program effectiveness on an area wide as well as jurisdiction-specific basis. Permittees shall utilize the CASQA Guidance[58] for developing these assessment measures at the six outcome levels. The assessment measures must target both water quality outcomes and the results of municipal enforcement activities consistent with the requirements of Appendix 3, Section IV.B.

B. The Annual Report shall include the findings of this review and a schedule to address necessary revisions, or a copy of the amended DAMP with the proposed changes. Replacement pages are acceptable if modifications are not extensive. Annual Reports shall also be submitted in electronic format.

C. Upon the effective date of this Order, the Permittees shall implement the 2007 DAMP and modify it to be consistent with the requirements of this Order and the schedules contained herein.

D. Each Permittee shall designate at least one representative to the Management Steering Committee and Technical Committee. The Principal Permittee shall be notified immediately, in writing, of changes to the designated representative to either Committee. The designated representative for each Committee shall attend that Committee's meeting as follows: at least one (1) out of two (2) Management Steering Committee meetings and eight (8) out of ten (10) Technical Committee meetings per year to discuss issues related to permit implementation and regional and statewide issues.

E. The Permittees shall continue to implement all elements of the approved DAMP. Program elements revised in compliance with the requirements of this Order must be implemented in conformance with the schedules specified in this Order following approval of the Executive Officer.

---

[58] CASQA, May 2007. Municipal Storm Water Program Effectiveness Assessment Guidance.

XVIII. FISCAL RESOURCES

A. Each Permittee shall exercise its full authority to secure the resources necessary to meet the requirements of this Order. This Order may be revised to adjust time schedules to accommodate prioritization of available resources.

B. The Permittees shall prepare and submit a financial summary to the Executive Officer. The financial summary shall be submitted with the Annual Report each year and shall, at a minimum, include the following:

1. Each Permittee's MS4 Permit compliance expenditures for the previous fiscal year;
2. Fiscal developments that may impact availability of funding for MS4 Permit compliance program implementation and to achieve the required implementation schedule;
3. Each Permittee's MS4 Permit compliance program budget for the current fiscal year;
4. A description of the source of funds to implement the MS4 Permit compliance program, and;
5. Each Permittee's estimated budget to implement the MS4 Permit compliance program for the next fiscal year.

XIX. MONITORING AND REPORTING PROGRAM

The Permittees must comply with Monitoring and Reporting Program No. R8-2010-0033, Appendix 3, and any revisions thereto, which are hereby made a part of this Order. The Executive Officer is hereby authorized to revise the Monitoring and Reporting Program in a manner consistent with this Order to allow the Permittees to participate in regional, statewide, national or other monitoring and reporting programs in lieu of or in addition to Monitoring and Reporting Program No. R8-2010-0033. In addition, dates for completion and implementation of certain program elements and reporting requirements are outlined in the Monitoring and Reporting Program.

XX. PROVISIONS

A. All reports submitted by the Permittees as per the requirements in this Order for the approval of the Executive Officer shall be publicly noticed and made available on the Regional Board's website, or through other means, for public review and comments. The Executive Officer shall consider all comments received prior to approval of the reports. Any unresolved significant issues shall be scheduled for a public hearing at a Regional Board meeting prior to approval by the Executive Officer.

B. Permittees shall demonstrate compliance with all the requirements in this Order and shall implement the DAMP and any modifications, revisions, or amendments thereto, which are developed pursuant to this Order or determined by the Permittees to be necessary to

meet the requirements of this Order. The DAMP, including any approved amendments thereto is hereby made an enforceable component of this Order.

C. The Permittees shall implement all elements of the DAMP and its components. Where the dates in the DAMP are different from the corresponding dates in this Order, the dates in this Order shall prevail. Any proposed revisions to the DAMP shall be submitted with the Annual Report for review and approval by the Executive Officer. All approved revisions to the DAMP shall be implemented as per the time schedules approved by the Executive Officer. In addition to those specific controls and actions required by: (1) the terms of this Order and (2) the DAMP and its components, each Permittee shall implement additional controls, if any are necessary, to reduce the discharge of Pollutants in Urban Runoff consistent with the MEP standard.

D. Certain BMPs implemented or required by the Permittees for Urban Runoff management may create habitat for vectors (e.g., mosquitoes and rodents) if not properly designed and maintained. Close collaboration and cooperative effort between the Permittees and local vector control agencies and the State Department of Health Services are necessary to minimize potential vector habitat and public health impacts resulting from vector breeding. Nothing in this Order is intended to prohibit inspection or abatement of vectors by the State or local vector control agencies in accordance with the respective Health and Safety Code.

E. Upon approval by the Executive Officer all plans, reports and subsequent amendments required by this Order shall be implemented and shall become an enforceable part of this Order. Prior to approval by the Executive Officer, these plans, reports and amendments shall not be considered as an enforceable part of this Order.

F. The MS4 permit application and special NPDES program requirements are contained in 40 CFR 122.21 (a), (b), (d)(2), (f), (p); 122.41 (a), (b), (c), (d), (e), (f), (g), (h), (i), (j), (k), (l); and 122.42 (c), and are incorporated into this Order by reference.

G. The Permittees must comply with all terms, requirements, and conditions of this Order. Any violation of this Order constitutes a violation of the CWA, its regulations and the California Water Code, and is grounds for enforcement action, Order termination, Order revocation and re-issuance, denial of an application for re-issuance, Order revisions, or a combination thereof.

H. Permittees must continue to take reasonable steps to minimize or prevent any discharge to the MS4 that has a reasonable likelihood of adversely affecting human health or the environment.

I. Regional Board staff, USEPA, and other authorized representatives must be allowed to:

1. Inspect Permittee records associated with compliance of this Order.

2. Access and copy records that are kept under the conditions of this Order.

3. Photograph and inspect any facilities or equipment (including monitoring and control equipment) that are related to or may impact storm water discharge or authorized Non-storm Water discharge.

4. Conduct sampling, and monitoring activities for the purpose of assuring compliance with this Order, or as otherwise authorized by the CWA and/or the Water Code.

5. Review the Permittee's programs and request the Regional Board to authorize modification to Permittee programs to comply with the requirements of this Order.

6. Request copies of data, monitoring reports, and sampling data and copies of the Permittee's conclusions and evaluations of the data.

J. This Order does not convey any property rights or any exclusive privileges.

K. The issuance of this Order does not authorize any injury to persons or property or invasion of other private rights, or any infringement of State or local law or regulations.

L. When Permittees become aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the Regional Water Board, State Board, or USEPA, the Permitttees must promptly submit such facts or information.

M. All applications, reports, or information submitted to the Regional Board, State Board, and/or USEPA are to be signed and certified by either:

1. A principal executive officer or ranking elected official. For purposes of this provision, a principal executive officer of a federal agency includes: (i) the chief executive officer of the agency, or (ii) a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrators of USEPA)

2. A duly authorized representative of the person in 1, above. A person is a duly authorized representative only if the authorization is made in writing by a person described above;

3. The authorization specified either an individual or a position having responsibility for the overall operation of the regulated facility or activity such as the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company (A duly authorized representative may thus be either a named individual or any individual occupying a named position.); and

4. The written authorization is submitted to the Executive Officer.

5. If an authorization described above is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization must be submitted to the Executive Officer prior to or together with any reports, information, or applications, to be signed by an authorized representative.

6. Any person signing a document described above must make the following certification:

   "I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations".

XXI. PERMIT MODIFICATION

A. Following appropriate public notice, and in accordance with 40 CFR 122.41(f), this Order may be modified, revoked or reissued prior to its expiration date for the following reasons:

   1. To address significant changes in conditions identified in the technical reports required by the Regional Board which were unknown at the time of the issuance of this Order;
   2. To incorporate applicable requirements of statewide water quality control plans adopted by the State Water Resources Control Board or any amendments to the Basin Plan (including TMDLS) approved by the Regional Board, the State Board and, if necessary, by the Office of Administrative Law and the USEPA;
   3. To comply with any applicable requirements, guidelines, or regulations issued or approved under the Clean Water Act, if the requirements, guidelines, or regulations contain different conditions or additional requirements than those included in this Order; or,
   4. To incorporate new or revised program elements and compliance schedule(s) necessary to comply with this Order;

B. The filing of a request by the Permittees for modification, revocation and re-issuance, or termination or a notification of planned changes or anticipated noncompliance does not stay any conditions of this Order.

C. Pursuant to Section 13228 of the Water Code, the Regional Board may exercise its option for allowing the portion of the City of Murrieta located within the Santa Ana Region to be regulated by the San Diego Regional Water Quality Control Board under its Riverside County MS4 Permit. Similarly, if the San Diego Regional Water Quality Control Board authorizes this Regional Board to exercise authority over the City of Menifee within the

portions of the City regulated by the San Diego Regional Water Quality Control Board, this Regional Board will exercise its authority under this Order in those Regions.

XXII. PERMIT EXPIRATION AND RENEWAL

A. This Order expires on January 29, 2015, and the Permittees must file a ROWD no later than 180 days in advance of such expiration date as application for issuance of new waste discharge requirements. The ROWD shall, at a minimum, include the following:

1. Names and mailing address(es) of the primary administrative and technical contacts for the Permittees that operate the MS4;
2. Any revisions to the DAMP including, but not limited to, all the activities the Permittees propose to undertake during the next permit term, goals and objectives of such activities, an evaluation of the need for additional source control and/or structural BMPs, any proposed pilot studies, etc.;
3. Changes in land use and/or population including map updates;
4. Any significant changes to the MS4 including map updates of the MS4; and
5. An assessment of the overall Urban Runoff management program and its effectiveness in meeting Water Quality Standards. If Water Quality Standards are not being met, the ROWD shall include new or revised program elements and compliance schedule(s) necessary to comply with Section VI of this Order.

B. The ROWD, Annual Reports and other information submitted under this Order shall be signed by either a principal executive officer or a ranking elected official (40 CFR 122.22(a)(3)) or a duly authorized representative as per 40 CFR 122.22(b).

C. This Order shall serve as an NPDES Permit pursuant to Section 402(p) of the Clean Water Act, or amendments thereto, and shall become effective ten days after the date of its adoption provided the Regional Administrator of the USEPA has no objections. If the Regional Administrator objects to its issuance, the Permit shall not become effective until such objection is withdrawn.

D. The Regional Board is authorized to enforce the terms of this permit under several provisions of the CWC, including, but not limited to, sections 13385, 13386, and 13387.

E. Order No. R8-2002-0011 is hereby rescinded.

I, Gerard J. Thibeault, Executive Officer, do hereby certify that the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, Santa Ana Region, on January 29, 2010.

Gerard J. Thibeault
Executive Officer

EXHIBIT “18”

ATTACHMENT 4

Comparison Between the Requirements of Tentative Order 2001-01, the Federal NPDES Storm Water Regulations, the Existing San Diego Municipal Storm Water Permit (Order 90-42), and Previous Drafts of the San Diego Municipal Storm Water Permit

A table comparing the Tentative Order's requirements with the requirements of other pertinent documents.

PERMITS COMPARISON (DRAFT)

Comparison Between the Requirements of Tentative Order No. 2001-01, the Federal NPDES Storm Water Regulations, the Existing San Diego Municipal Storm Water Permit (Order No. 90-42), and Previous Drafts of the San Diego Municipal Storm Water Permit

Conclusions

1. **Urban runoff causes or contributes to the impairment of every known impaired water body in the San Diego Region** (i.e., every 303(d) listed water body in the Region is impaired, at least in part, because of urban runoff).

2. **During the past 10 years (the period during which the Copermittees have been subject to Order No 90-42), water quality in the Region has continued to decline. The decline is the result of the increasing urban runoff pollution associated with the growth of the Region** (i.e., increasing urban development and human population).

3. **The continued degradation of the Region's receiving waters is evidence that current efforts to control urban runoff are not working** (i.e., current Copermittee Urban Runoff Management Programs under Order No. 90-42 are either inadequate or ineffective). In other words, we are losing the battle against urban runoff pollution.

4. **More must be done to reduce urban runoff pollutants if the beneficial uses (e.g., fishing, swimming, aquatic habitat, etc.) of the Region's receiving waters are to be protected.**

5. **Tentative Order No. 2001-01 (the proposed renewal of Order No 90-42) is the answer. If properly implemented, Tentative Order 2001-01 will significantly "slow the current rate" of water quality degradation in San Diego. Furthermore, the Tentative Order has the potential to "improve" the quality of San Diego receiving waters over the long term (i.e., 10-20 years).**

6. **Tentative Order No. 2001-01 is the product of an evolving development process that has included the release of two previous drafts and spanned more than six years.** The Tentative Order incorporates the SDRWQCB's responses to over 200 pages of public comments on the 1995 and 1998 drafts of the permit.

7. **Because Order No. 90-42, the interim drafts, and Tentative Order No. 2001-01 are all based on the same 1990 federal regulations, the underlying objectives and essential requirements of these documents are all "fundamentally the same".** In other words, Tentative Order No. 2001-01 is not a "new" permit. It has the same underlying objectives and requirements as Order No. 90-42, the "early" first round permit to which the Copermittees have been subject for the past ten years.

8. **Although fundamentally very similar, Tentative Order 2001-01 will require Copermittees to do more and to expend a greater level of effort than is currently required under Order No. 90-42.**

9. **Relative to Order No. 90-42, the requirements of Tentative Order No. 2001-01 are significantly expanded in that they are more numerous, more specific/detailed, and more stringent than the requirements in Order No. 90-42.** The SDRWQB believes that the expanded requirements are justified and necessary in light of the declining quality of the Region's receiving waters.

10. **Approximately 80% of the requirements contained in Tentative Order No 2001-01 are also contained in the second draft of the permit released October 1998.** This means approximately 80% of the permit requirements have been known to the Copermittees (and available for their review and implementation) for at least two years.

11. **The remaining 20% of the requirements in the Tentative Order are "new", meaning that they have been added within the past two years.** If 80% of the permit has been known for at least two years, then theoretically, the Copermittees have had the recent 51 day review period (ending Nov 30, 2000) to assimilate the new remaining 20% of the permit[1].

12. **Greater than 40% of the requirements contained in Tentative Order No 2001-01 are also contained in the Copermittee's current first round permit, Order No. 90-42.** This means that at least 40% of the Tentative Order's requirements have been known to the Copermittees for the past ten years. Accordingly, a Copermittee that is currently in compliance with Order No. 90-42 will have at least 40% of the Tentative Order's requirements already met and fully implemented during the past ten years.

13. **Of the 80% of the Tentative Order's requirements that have been known to the Copermittees for at least two years, half (or 50% of 80%) have been known to the Copermittees for no less than 10 years and half have been known for no less than two years.**

14. **Approximately 60% of the requirements in Tentative Order 2001-01 are based solely on the 1990 federal NPDES Storm Water Regulations. The remaining 40% of the requirements in the Tentative Order "exceed the federal regulations". Requirements that "exceed the federal regulations" are either more numerous, more specific/detailed, or more stringent than the requirements in the regulations.**

15. **The 40% of the requirements in Tentative Order 2001-01 which "exceed the federal regulations" are based almost exclusively on (1) guidance documents**

[1] Current law requires a 45 day comment period.

developed by USEPA[2]; and (2) SWRCB's orders describing statewide precedent setting decisions on MS4s permits[3].

16. **The SDRWQCB is authorized to include requirements in the Tentative Order which "exceed the federal regulations" under both section 402(p)(3)(iii) of the Clean Water Act, as well as section 13377 of the California Water Code.** In the course of carrying out its mission, the SDRWQCB is authorized to require any more stringent controls it deems necessary to protect the beneficial uses of receiving waters, address specific local problems (e.g., beach closures), implement water quality control plans, or prevent nuisance.

17. **Taken as a whole, the requirements contained in Tentative Order 2001-01 represent the SDRWQCB's interpretation/definition of MEP for the San Diego Region.** MEP, or the maximum extent practicable, is the technology-based standard established by Congress for municipal dischargers of urban runoff (i.e., MS4 dischargers).

18. **The inclusion in a renewal MS4 permit (e.g., Order No. 2001-01) of requirements that are more stringent than those in an initial MS4 permit is supported by USEPA[4] and the SWRCB[5].** Over time it is expected that subsequent MS4 permits will require an increasing level of effort on the part of the municipalities that is commensurate with the need to protect beneficial uses. This is particularly appropriate where the initial permit was an "early" permit.

19. **SDRWQCB has Ample Legal Authority to Adopt Tentative Order No. 2001-01.** Each of the requirements contained in Tentative Order is solidly grounded in the Clean Water Act, the California Water Code, the federal storm water regulations, USEPA guidance documents on MS4 permits, and SWRCB Orders relating to MS4 permits.

Comparison Table

The attached table, showing the development process of Tentative Order No. 2001-01, is provided to call attention to the similarities and differences between the requirements of

---

[2] Environmental Protection Agency. 1992. Guidance Manual for the Preparation of Part 2 of the NPDES Permit Applications for Discharges from Municipal Separate Storm Sewer Systems. EPA 833-B-92-002.

[3] In Orders WQ 98-01 and 99-05, the SWRCB prescribed specific precedent setting Receiving Water Limitations language to be included in all future MS4 permits. On October 5, 2000 the SWRCB made its final decision to uphold the LARWQCB's adoption of Standard Urban Storm Water Mitigation Plans (SUSMPs) requirements for new development in MS4 permits.

[4] U.S. Environmental Protection Agency. 1996. Interim Permitting Approach for Water Quality-Based Effluent Limitations in Storm Water Permits. 61 FR 43761.

[5] On October 5, 2000 the SWRCB made its final decision to uphold the LARWQCB's adoption of Standard Urban Storm Water Mitigation Plans (SUSMPs) for new development in MS4 permits.

Tentative Order No. 2001-01 and the current San Diego Municipal Storm Water Permit (Order No. 90-42). Additionally the table compares both the existing and proposed permits, as well as the two previous drafts, to the1990 federal NPDES Storm Water Regulations for Phase I (federal regulations)[6].

The orders, regulations, and drafts are presented in the table chronologically so that the evolution of the Tentative Order's requirements is evident over time. The differences and similarities between the various documents can be observed in the table by noting the number of "X's" in each column. An "X" indicates that a given requirement is included in the document; while a "-" means that the requirement is missing.

Order No. 90-42 was the first document included in the table to be issued (in July of 1990), and has the least number of requirements. As the table indicates, Order 90-42 was an "early" permit, in that it was released prior to the November 1990 promulgation of the Federal NPDES storm water regulations. Although Order No. 90-42 contained the "essentials" of the 1990 regulations, the requirements were written in very broad generic and often vague terms. Broad generic terms were incorporated into the permit for the purpose of providing the maximum amount of flexibility to the Copermittees in implementing the new requirements (flexibility was, in fact, the stated reason for issuing the permit in advance of the final regulations).

When the federal regulations were issued by the United States Environmental Protection Agency (USEPA) in November of 1990, they were significantly more detailed and contained more requirements than Order No. 90-42. **The federal regulations, which implement and clarify the federal statue, specify the minimum fundamental or essential requirements that must be contained in all municipal storm water permits.** For this reason, the existing, proposed, and previous drafts of San Diego Municipal Storm Water permit are based on, and grounded in, the federal regulations. It is to the federal regulations that each of the documents in the table should be ultimately compared. To enhance understanding and clarify the federal regulations, USEPA's intent in drafting the regulations was expanded upon in the "Preamble" to the federal regulations and in several guidance documents (which provide further detail and insight on USEPA intent). These supporting documents have also been relied upon in developing the requirements of the Tentative Order and its previous drafts.

Five Fundamental Requirements of an MS4 Permit

When distilled down to its essence, the federal regulations direct that municipalities implement an Urban Runoff Management Program that, at a minimum, includes the five following fundamental requirements:

[6] The 1990 final phase I NPDES federal storm water regulations, codified at 40CFR 122.26, implement and interpret section 402(p) of the Clean Water Act. Section 402(p) is the section of the Clean Water Act that requires municipalities to obtain an NPDES permit for their discharges of storm water. The 1987 amendments to the Clean Water Act added section 402(p). The Clean Water Act is the 1976 federal statue which requires NPDES permits to regulate point source discharges of pollutants to waters of the United States.

1. Prohibit non-storm water discharges into MS4s.

2. Implement best management practices (BMPs) to reduce pollutant discharges into MS4s to the maximum extent practicable (MEP).

3. Ensure that discharges from the MS4 do not cause or contribute to an exceedance of water quality objectives in receiving waters.

4. Identify (actively find) and eliminate sources of illicit discharges.

5. Enforce local ordinances and permits.

Need for Increased Permit "Specificity"

The table below demonstrates the increase in permit specificity over time. There are several important reasons for the increase in the specificity of the permit language, which are discussed below.

1. Copermittees Requested Increased Specificity; Tentative Order 2001-01 provides Increased Specificity

Copermittees have repeatedly requested that the SDRWQCB define the minimum levels of actions/efforts required on their parts to keep them in minimum compliance with Order No. 90-42. As previously explained, the early permit was purposely written in broad terms to provide maximum flexibility the Copermittees. For example, Order No. 90-42 directs the Copermittees to develop and implement a comprehensive Urban Runoff Management Program, but unlike the Tentative Order, provides very little direction or detail on what that program must contain, and even less direction on minimum levels of effort required for compliance. As a result, many Copermittees frequently ask the SDRWQCB to provide direction and specificity on these topics. Tentative Order No. 2001-01 directly responds to this request by specifying minimum required program components, as well as the minimum elements of each component. These types of definitions require specific language, rather than broad directives, since they convey all of the activities expected of the Copermittees. In this way, the Tentative Order defines the minimum level of effort needed for compliance. A permit which describes each of the activities to be conducted will be greater in length and detail than a permit that does not. Although responsive to the Copermittees' request, much of the specifics provided in the Tentative Order had already been provided to the Copermittees over ten years ago in the form of the federal regulations.

2. Copermittees Requested that MEP be Defined; Tentative Order 2001-01 Defines MEP

Maximum Extent Practicable or MEP is the technology-based standard established by Congress in the Clean Water Act (section 402(p)(3)(B)(iii)) that municipal dischargers of storm water must meet. Technology-based standards establish the level of pollutant

reductions that dischargers must achieve, typically by treatment or by a combination of treatment and source control BMPs. In this case, municipal dischargers are required to reduce the discharge of pollutants into and from their MS4s to the MEP. The MEP standard therefore provides specificity about the minimum amount of effort needed for permit compliance. MEP considers economics and is generally, but not necessarily, less stringent than BAT[7]. A definition of MEP is not provided either in the statute or in the regulations. Instead the definition of MEP is dynamic and is intended to be defined over time by the following process: municipalities propose their definition of MEP by way of their Urban Runoff Management Programs. The total collective and individual activities conducted pursuant to their Urban Runoff Management Programs become their "proposal" for MEP, as it applies both to their overall management program and level of effort, as well as to any specific activity (e.g., what is MEP for street sweeping, or MEP for sanitary sewer maintenance?).

In a memorandum dated February 11, 1993 entitled "Definition of Maximum Extent Practicable," Elizabeth Jennings, Senior Staff Counsel for the SWRCB writes "...to achieve the MEP standard, municipalities must employ whatever best management practices (BMPs) are technically feasible (i.e., are likely to be effective) and are not cost prohibitive". She goes on to state, in part, "...The final determination regarding whether a municipality has reduced pollutants to the maximum extent practicable can only be made by the Regional or State Water Boards, and not by the municipal discharger."

Tentative Order No. 2001-01 defines MEP in the San Diego Region. The overall program scope and level of effort specified in the Tentative Order's Urban Runoff Management Programs is the SDRWQCB's interpretation of MEP. By defining the minimum standard, the SDRWQCB has eliminated much of the guesswork and uncertainly previously associated with permit compliance.

3. Copermittees Provided Substantial Comments on Previous Drafts; Tentative Order No. 2001-01 Responds to All Comments Received

Tentative Order No. 2001-01 is detailed in its requirements in part due to the extended reissuance process it has undergone. Drafts of the San Diego Municipal Storm Water Permit have been released for public comment twice before (in 1995 and 1998). During the course of development, the SDRWQCB has asked for and received a significant number of comments on previous drafts (informally during individual discussions and collective meetings, as well as formally in more than 200 pages of written comments). Each comment has been carefully reviewed and considered. The language in Tentative Order No. 2001-01 incorporates the SDRWQCB's responses to all comments received prior to its release on October 11, 2000.

Over the years and in a variety of forums, both the Copermittees and the public have generally sought more clarification and detailed explanations of permit requirements.

[7] BAT, or best available technology, is the technology-based standard established by Congress for industrial dischargers of storm water.

Many of the comments received on earlier drafts have contained specific requests for the SDRWQCB to provide additional clarification or specificity on a variety of permit requirements.

In response to these comments, the level of detail of the Tentative Order has increased over time. This evolution can be seen in the attached table by the increasing number of requirements in each subsequent issuance of the Tentative Order (note totals at end of table). Tentative Order 2001-01 provides the additional clarification and increased specificity requested, while seeking to address the entire scope and variety of issues raised during the lengthy public participation process. One consequence of an extended development process and repeated requests for greater specificity, is that overall volume of the permit has also increased proportionately over the years. It may be interesting to note that many of the "very recently received" comments on Tentative Order 2001-01 continue to request additional clarification on specific requirements.

4. Greater Specificity Will Facilitate Assessment Of Copermittee Compliance

Assessing Copermittee compliance with Order No. 40-42 has been challenging and resource intensive. There are many reasons for this including the following:

- Storm water permits are based on BMPs and lack numeric effluent limits
- MEP, the technology based standard for MS4 permits, had not been defined
- Order No. 90-42 was an "early" permit with broad vague language
- Order No. 90-42 lacked other "measurable" performance standards
- Storm water management is a developing field (most other discharges regulated by the SDRWQCB are well defined)

With respect to assessing permit compliance, a storm water permit's lack of numeric effluent limitations is a distinct disadvantage. This is because compliance (or noncompliance) with numeric effluent limitations is one of the most important tools used by the regional boards in their overall assessment of a discharger's compliance. The comparison of routine effluent monitoring data to the numeric effluent limitations specified in the permit provides an accurate and effective measure of permit compliance.

In contrast, assessing compliance with Order No. 90-42, a BMP-based "early" storm water permit, has proven complex and subjective. When effluent limits are absent, the inclusion of greater specificity is made all the more necessary. Reliance on BMPs, as opposed to numeric effluent limits, demands specification of those programs and activities that are relied upon to reduce pollution. To assess compliance with the early permit, the SDRWQCB has utilized a variety of other tools, with varying degrees of effectiveness (See "Status of Copermittee Compliance", Attachment 16).

Tentative Order 2001-01 now contains detailed narrative descriptions of its requirements that represent the SDRWQCB's definition of MEP. Such detailed requirements remove ambiguity by clearing spelling out the SDRWQCB' minimum expectations. In summary,

the increased specificity of the Tentative Order will greatly enhance a Copermittee's, the SDRWQCB's, or other interested party's ability to assess permit compliance.

Need For Increased Permit "Stringency" - - Exceeding the Federal Regulations

There has also been an increase in number of and stringency of permit requirements over time. As can be seen in the table below, Order No. 2001-01 requires considerably more of Copermittees than does Order No. 90-42. Furthermore, in some respects, the requirements of Tentative Order No. 2001-01 exceed the minimum requirements as specified in the federal regulations. The need for increased stringency and to exceed the federal regulations is discussed below.

1. Continuing Water Quality Degradation Requires Increased Stringency

The increasing impairment of our Region's waters due to urban runoff (as discussed on page 5 of the Fact Sheet/Technical Report, provided as Attachment 7 of Agenda Item 5) demands increased stringency in municipal storm water permits. The population and urban development of our Region has expanded dramatically since Order No. 90-42 was issued ten years ago, and the resulting water quality problems have mirrored this expansion. The closure or posting of local beaches has become all too familiar. Urban runoff now directly causes or contributes to all of the known receiving water quality impairments in the San Diego Region. The importance of water quality to our region's tourism industry and way of life has caused an increase in public outcry against urban runoff contamination and beach closures. Urban runoff issues are now a common site on our Region's newspaper headlines and governing body agendas. Legislation at the state level regarding water quality (such as AB 411) is being generated within our Region due in large part to the Region's pronounced urban runoff water quality issues.

The continued degradation of the Region's receiving water is evidence that the current collective efforts of the Copermittees to control urban runoff are either ineffective or inadequate. More must be done to reduce urban runoff pollution if the beneficial uses of the Region's receiving waters are to be protected. The more stringent requirements of the Tentative Order are needed to address these problems and the increased attention and expectations that accompany them.

2. Tentative Order Reflects a Decade of Evolving Technology

Versions of the San Diego Municipal Storm Water Permit have also become increasingly stringent due to the advancing progress in urban runoff management and technology which has occurred over time. Tentative Order No. 2001-01, and its requirements, reflect a 10 year evolution in the field of urban runoff management. Information on the impacts of urban runoff, as well as how to minimize these impacts, have greatly expanded since the existing Municipal Storm Water Permit for San Diego was first issued in 1990. In 1990, very few reference materials were available to Copermittees. Today there is a large and growing body of excellent resources available.

The Tentative Order takes advantage of this increased knowledge and the passage of time, by including additional requirements which have been proven effective or which are necessary to protect receiving waters from increasing urban runoff pollution. The result of the technology evolution is a longer and more detailed, but also more effective, permit.

3. Increased Stringency is Supported by USEPA and SWRCB

The increased specificity included in the Tentative Order is in large part derived from USEPA's guidance as provided in its *Guidance Manual for the Preparation of Part 2 of the NPDES Permit Applications for Discharges from Municipal Separate Storm Sewer Systems*[8] and its *Interim Permitting Approach for Water Quality-Based Effluent Limitations in Storm Water Permits.*[9] Where the Tentative Order is more stringent than the federal regulations, the stringency is frequently based on the recommendations of the Guidance Manual. USEPA's guidance and the 1999 Phase II Storm Water regulations indicate that MS4 permits are to increase in stringency when reissued, especially where beneficial uses of receiving waters are not being protected.

The Interim Permitting Approach also supports increased specificity in storm water permits, recommending that municipal storm water permits use "best management practices (BMPs) in first-round storm water permits, and **expanded or better-tailored BMPs in subsequent permits**, where necessary, to provide for the attainment of water quality standards. In cases where adequate information exists to develop more specific conditions or limitations to meet water quality standards, these conditions or limitations are to be incorporated into storm water permits, as necessary and appropriate" (emphasis added). It is important to note that the SWRCB cited USEPA's Interim Permitting Approach as support for its recent tentative decision which upheld the increased specificity of numeric sizing criteria requirements for post-construction BMPs as appropriate requirements in municipal storm water permits. This SWRCB decision supporting Standard Urban Storm Water Mitigation Plans (SUSMPs) demonstrates the SWRCB's general recognition of the need for increased requirements in municipal storm water permits.

The SWRCB's decision to require MS4 discharges to meet water quality standards also supports increased specificity in municipal storm water permits. In Orders WQ 98-01 and 99-05, the SWRCB prescribed specific precedent setting Receiving Water Limitations language to be included in all future MS4 permits. This language specifically requires that MS4 dischargers meet water quality standards and allows for the use of narrative BMPs (increasing in stringency and implemented in an iterative process) as the mechanism by which water quality standards can be met. The idea of an iterative process

---

[8] U.S. Environmental Protection Agency. 1992. Guidance Manual for the Preparation of Part 2 of the NPDES Permit Applications for Discharges from Municipal Separate Storm Sewer Systems. EPA 833-B-92-002.

[9] U.S. Environmental Protection Agency. 1996. Interim Permitting Approach for Water Quality-Based Effluent Limitations in Storm Water Permits. 61 FR 43761.

of increasingly stringent BMP implementation is consistent with the concept of increasingly stringent MS4 permits. For example, increasingly stringent BMP implementation is required for discharges to impaired water bodies; likewise, increasingly stringent MS4 permits are required for regions with numerous water bodies impaired by urban runoff.

The SWRCB clearly expresses its intent that MS4 permits should increase in stringency in a manner similar to increasingly stringent BMP implementation when it states in a recent memorandum "[...] **because most MS4 discharges enter impaired water bodies, there is a real need for permits to include stringent requirements to protect those water bodies. As total maximum daily loads (TMDLs) are developed, it is likely that MS4s will have to participate in pollutant load reductions, and the MS4 permits are the most effective vehicles for those reductions."**

In summary, Tentative Order No. 2001-01 is consistent with USEPA and SWRCB support for increasing stringency in MS4 permits as necessary to protect the beneficial uses of the Region's receiving waters from further impairment.

Tentative Order 2001-01 Is Fundamentally The Same As Order No. 90-42

The "early" permit and each of the drafts of the renewal permit as well as the federal regulations (from which the essential requirements are derived) all have the same basic objective, namely, to reduce pollutants in urban runoff discharges to receiving waters. As shown in the table below, each of the documents also contain each of the fundamental underlying requirements specified in the federal regulations.

From a broad brush perspective, (even though differing substantially in level of detail and number of pages), each version of the Order is fundamentally the same. Tentative Order No. 2001-01 is not a "new" permit. It has the same underlying objective and contains the same essential ingredients as Order No. 90-42, the "early" permit to which the Copermittees have been subject for the past ten years.

The comparisons table clearly shows that the number, specificity, and stringency of permit requirements has increased over time throughout the permit development process. Perhaps more importantly however, the table also demonstrates that the most fundamental requirements, as specified in the federal regulations, have remained the same through time and that each are contained in Order No. 90-42, in the Tentative Order, and in both of the previous drafts.

Furthermore because the language contained in Order No. 90-42 and the federal regulations is quite broad, the basic requirements typically encompass or embody the more enhanced requirements of Tentative Order No. 2001-01 and previous drafts. For example, with regards to requirements for enforcement by the Copermittees, Order No. 90-42 simply states "Pursue enforcement actions as necessary to ensure compliance [...]." Though this statement is relatively broad, it embodies the more specific requirements of Tentative Order No. 2001-01, such as the Tentative Order's requirements

to "enforce ordinances and permits as necessary [at construction, industrial, and commercial sites] to maintain compliance with the Order." In a reciprocal manner, most of the requirements of Tentative Order No. 2001-01 are embodied in Order No. 90-42 and the federal NPDES storm water regulations. Footnotes to the table are occasionally provided to exhibit these types of circumstances.

The similarity of the various order, drafts, and regulations included in the table can also be observed when the number of requirements in each document are tallied. For example, roughly 80% of the Tentative Order's requirements were also present in the 1998 draft of the San Diego Municipal Storm Water Permit. Even the requirements of Order No. 90-42 encompass roughly 40% of the requirements of Tentative Order No. 2001-01. This exhibits the similarity in the requirements of the various documents covered in the table, and also demonstrates that the majority of the requirements of Tentative Order No. 2001-01 have been presented for public review prior to the public release of the Tentative Order.

Requirement Category	Requirements	Order No. 90-42 (July, 1990)	Federal NPDES Regulations (November, 1990)	1995 Draft (May, 1995)	1998 Draft (October, 1998)	Tentative Order No. 2001-01 (October, 2000)
Prohibition of Various Types of Discharges (Section A., page 8 of Tentative Order No. 2001-01)	Prohibit discharges into and from municipal separate storm sewer systems (MS4s) causing pollution, contamination, or nuisance	X	X	X	X	X
	Prohibit discharges from MS4s causing exceedances of water quality objectives	X	X	X	X	X
	Prohibit discharges into and from MS4s containing pollutants which have not been reduced to maximum extent practicable (MEP)	X	X	X	X	X
	Prohibit post-development runoff from new development which is greater in peak rate or velocity than pre-development runoff from the same site	-	-	X	X	X
	Prohibit discharges of post-development runoff into a Clean Water Act section 303(d) water body containing any pollutant (for which the water body is already impaired) in levels exceeding predevelopment levels (for those same pollutants)	-	-	-	-	X
	Prohibit discharges from MS4s as required by Basin Plan Prohibitions	X	N/A	X	X	X
Prohibitions of Non-Storm Water Discharges (Section B., page 9 of Tentative Order No. 2001-01)	Prohibit non-storm water discharges, except de minimis discharges	X	X	X	X	X
	Prohibit de minimis discharges if source of pollutants or require BMPs for the discharges	X	X	X	X	X
	For de minimis discharges not prohibited, submit information on discharge not prohibited and what BMPs will be required	-	-	X	X	X
	Require BMPs for non-emergency fire fighting flows which are significant sources of pollutants	-	X	X	X	X

Requirement Category	Requirements	Order No. 90-42 (July, 1990)	Federal NPDES Regulations (November, 1990)	1995 Draft (May, 1995)	1998 Draft (October, 1998)	Tentative Order No. 2001-01 (October, 2000)
	Prohibit non-prohibited non-storm water discharges with pollutants which can't be reduced to MEP	X	X	X	X	X
Receiving Water Limitations (Section C., page 10 of Tentative Order No. 2001-01)	Prohibit discharges causing violation of water quality standards	X	X	X	X	X
	If exceedance of water quality standards occurs, implement control measures stop exceedance	X	X	-	X	X
	If exceedance of water quality standards occurs, notify SDRWQCB of exceedance and submit report to SDRWQCB of measures to be taken	X	-	-	X	X

Requirement Category	Requirements	Order No. 90-42 (July, 1990)	Federal NPDES Regulations (November, 1990)	1995 Draft (May, 1995)	1998 Draft (October, 1998)	Tentative Order No. 2001-01 (October, 2000)
	If exceedance of water quality standards occurs, revise urban runoff management program and monitoring program, and implement the programs	-	-	-	X	X
Legal Authority (Section D., page 10 of Tentative Order No. 2001-01)	Establish, maintain, and enforce legal authority to control pollutant discharges into and from MS4	X[10]	X[11]	X	X	X
	Establish legal authority which authorizes Copermittee to control pollutant discharges from industrial and construction activities into MS4	X	X	X	X	X
	Establish legal authority which authorizes Copermittee to prohibit all illicit discharges	X	X	X	X	X
	Establish legal authority which authorizes Copermittee to prohibit and eliminate illicit connections	X	X	X	X	X
	Establish legal authority which authorizes Copermittee to control discharge of spills, dumping, or disposal of materials other than storm water into MS4	X	X	X	X	X

[10] Much of the language in Order No. 90-42 regarding the Copermittees' attainment of legal authority is very broad. It states "Enact legislation and ordinances as necessary to ensure compliance with the stormwater management program and the implementation plans." SDRWQCB interprets this language as requiring the establishment of legal authority to control all pollutant discharges into and from the MS4. Therefore, all requirements regarding the attainment of legal authority for the purpose of controlling pollutant discharges into and from the MS4 are "checked" in the Order No. 90-42 column.

[11] The Federal NPDES regulations require Copermittees to operate pursuant to legal authority which enables them to "[R]equire compliance with conditions in ordinances, permits, contracts, and orders" (40 CFR 122.26(d)(2)(i)(E). Therefore, the Federal NPDES regulations require the Copermittees to have legal authority to comply with requirements in orders from the SDRWQCB. Accordingly, legal authority requirements necessary to ensure compliance with SDRWQCB orders are "checked" in the Federal NPDES Regulations column.

Requirement Category	Requirements	Order No. 90-42 (July, 1990)	Federal NPDES Regulations (November, 1990)	1995 Draft (May, 1995)	1998 Draft (October, 1998)	Tentative Order No. 2001-01 (October, 2000)
	Establish legal authority which authorizes Copermittee to require compliance with Copermittee ordinances, permits, contracts, or orders	X	X	X	X	X
	Establish legal authority which authorizes Copermittee to utilize enforcement mechanisms	X	X	X[12]	X	X
	Establish legal authority which authorizes Copermittee to control pollutants from one portion of shared MS4 to another through interagency agreements	X	X	X	X	X
	Establish legal authority which authorizes Copermittee to carry out inspections, surveillance, and monitoring necessary to determine compliance	X	X	X	X	X
	Establish legal authority which authorizes Copermittee to require the use of BMPs	X	X	X	X	X
	Provide certified statement that Copermittee has adequate legal authority	-	-	X	X	X
	Provide certified statement that identifies responsibilities of each municipal department which conducts urban runoff activities	-	-	X	-	X
	Provide certified statement citing urban runoff related ordinances and how they are enforceable	-	-	X	-	X
	Provide certified statement describing how ordinances are implemented and appealed	-	-	X	-	X

[12] The 1995 Draft requires legal authority to be obtained which authorizes the Copermittee to "[R]equire compliance with conditions in ordinances, permits, contracts, or orders." Legal authority to "require compliance" is analogous to legal authority to "enforce." Therefore, the requirement to "establish legal authority which authorizes Copermittee to utilize enforcement mechanisms" is "checked" in the 1995 Draft column.

Requirement Category	Requirements	Order No. 90-42 (July, 1990)	Federal NPDES Regulations (November, 1990)	1995 Draft (May, 1995)	1998 Draft (October, 1998)	Tentative Order No. 2001-01 (October, 2000)
	Provide certified statement describing issuance of administrative orders and injunctions or use of court system for enforcement actions	-	-	-	-	X
Technology Based Standards (Section E., page 12 of Tentative Order No. 2001-01)	BMPs shall be implemented to reduce pollutants discharges into and from the MS4 to the MEP	X	X	X	X	X
	Pollutant discharges into and from the MS4 from industrial activity owned by the Copermittee shall be reduced to BAT/BCT	-	X	X	X	X
	Pollutant discharges into and from the MS4 from construction activity owned by the Copermittee shall be reduced to BAT/BCT	-	X	X	X	X
Urban Runoff Management Plan (Section F., page 13 of Tentative Order No. 2001-01)	Implement urban runoff management plan to reduce discharge of pollutants into and from MS4	X	X	X	X	X
Land-Use Planning for New Development and Significant Redevelopment (Section F.1., page 13 of Tentative Order No. 2001-01)	Reduce pollutant discharges from new development and redevelopment to the MEP	X	X	X	X	X
	Utilize urban planning to minimize discharge of pollutants in urban runoff	X	X	X	X	X
	Minimize short and long-term impacts on receiving water quality from new development and redevelopment	-	-	-	-	X
	Incorporate water quality and watershed principles into General Plan	-	-	-	-	X
	Modify development project approval processes	-	-	X	X	X
	Include conditions of approval in local permits for new development	-	-	X	X	X

Requirement Category	Requirements	Order No. 90-42 (July, 1990)	Federal NPDES Regulations (November, 1990)	1995 Draft (May, 1995)	1998 Draft (October, 1998)	Tentative Order No. 2001-01 (October, 2000)
	Revise environmental review processes and CEQA initial study checklists	-	-	-	X	X
	Conduct education efforts focused on new development and redevelopment	-	-	-	-	X
	Educate municipal staff on requirements for new development and redevelopment	-	-	X	X	X
	Educate project applicants, contractors, developers, property owners, etc. on requirements for new development and redevelopment	-	-	X	X	X
Land-Use Planning for New Development and Significant Redevelopment (SUSMPs) (Section F.1.b(2)., page 15 of Tentative Order No. 2001-01)	Develop Standard Urban Storm Water Mitigation Plans to reduce pollutants and runoff flows from priority development project categories	-	-	-	X	X
	Implement post-construction BMPs for new development and redevelopment	-	X	X	X	X
	Require structural post-construction BMPs to meet design criteria and performance standards	-	-	X	X	X
	Require structural post-construction BMPs for priority development project categories to meet numeric sizing criteria	-	-	-	-	X
	Develop procedure for pollutants of concern to be identified for new development projects	-	-	-	-	X
	Develop a process by which SUSMPs will be implemented	-	-	-	-	X
	Develop a program to manage waivers from SUSMPs	-	-	-	-	X
	Require protection of groundwater resources when BMPs with the primary function of infiltration are used	-	-	-	-	X

Requirement Category	Requirements	Order No. 90-42 (July, 1990)	Federal NPDES Regulations (November, 1990)	1995 Draft (May, 1995)	1998 Draft (October, 1998)	Tentative Order No. 2001-01 (October, 2000)
Construction (Section F.2., page 21 of Tentative Order No. 2001-01)	Reduce pollutant discharges from construction sites	X	X	X	X	X
	Require implementation of pollution prevention methods at construction sites	-	X[13]	X	X	X
	Update grading ordinances	-	-	-	X	X
	Modify construction and grading approval processes	-	-	-	X	X
	Include conditions of approval in local grading and construction permits to ensure pollutant discharges are reduced to MEP	-	-	X	X	X
	Inventory all construction sites	X[14]	X	-	X	X
	Prioritize construction sites for construction oversight activities	-	X[15]	-	X	X
	Require implementation of designated minimum BMPs at each construction site	X	X	X	X	X

[13] The Preamble to the Federal NPDES regulations states "[I]n implementing these regulations, EPA and the States will strive to achieve environmental results in a cost effective manner by placing high priority on pollution prevention activities [...]." For this reason, SDRWQCB interprets Federal NPDES regulation requirements for implementation of control measures to include requirements for implementation of pollution prevention control measures. Accordingly, all requirements regarding pollution prevention are "checked" in the Federal NPDES Regulations column.

[14] The language in Order No. 90-42 regarding requirements for pollutant source inventories is very broad. It states "The permittees shall inventory [...] major sources of pollutants such as industrial and military and other federal facilities, airports, highways, shopping centers, and large parking areas." Staff interprets this language to apply to all land-use areas within each Copermittee's jurisdiction, including construction, municipal, industrial, commercial, and residential areas. Therefore, all requirements regarding pollutant source inventories are "checked" in the Order No. 90-42 column.

[15] The Federal NPDES regulation requirements for prioritization are broad. They state "Proposed management programs shall describe priorities for implementing controls." SDRWQCB interprets this language to apply to all land-use areas within each Copermittee's jurisdiction, including construction, municipal, industrial, commercial, and residential areas. Therefore, all requirements regarding prioritization are "checked" in the Federal NPDES Regulation column.

Requirement Category	Requirements	Order No. 90-42 (July, 1990)	Federal NPDES Regulations (November, 1990)	1995 Draft (May, 1995)	1998 Draft (October, 1998)	Tentative Order No. 2001-01 (October, 2000)
	Require implementation of additional BMPs at construction sites tributary to Clean Water Act section 303(d) water bodies	X	X	X	X	X
	Inspect construction sites for compliance with ordinances and permits	-	X	X	X	X
	Establish inspection frequencies for construction sites based on their prioritization	-	X	X	X	X
	Inspect high priority construction sites weekly (or monthly if SWPPP has been reviewed and is found to have been implemented)	-	-	-	-	X
	Inspect medium and low priority construction sites twice during the wet season	-	-	-	-	X
	Inspect construction sites as needed during the dry season	-	-	-	-	X
	Enforce ordinances and permits at all construction sites	X[16]	X	X	X	X
	Provide notification to SDRWQCB of non-compliant sites	X[17]	X	X	X	X
	Conduct education efforts focused on construction	-	X	X	X	X
	Educate municipal staff on requirements for construction	-	-	X	X	X
	Educate project applicants, contractors, developers, property owners, etc. on requirements for construction	-	X	X	X	X

[16] The language in Order No. 90-42 regarding enforcement is very broad. It states "[P]ursue enforcement actions as necessary to ensure compliance with the stormwater management programs and the implementation plans." SDRWQCB interprets this language to apply to all areas within each Copermittee's jurisdiction, including construction, municipal, industrial, commercial, and residential areas. Therefore, all requirements regarding enforcement are "checked" for Order No. 90-42.

[17] Order No. 90-42 requires reporting of all instances of non-compliance.

Requirement Category	Requirements	Order No. 90-42 (July, 1990)	Federal NPDES Regulations (November, 1990)	1995 Draft (May, 1995)	1998 Draft (October, 1998)	Tentative Order No. 2001-01 (October, 2000)
Municipal (Section F.3.a., page 24 of Tentative Order No. 2001-01)	Reduce pollutant discharges from municipal areas and activities	X	X	X	X	X
	Reduce impacts on receiving waters from operating and maintaining public streets, roads, and highways	-	X	X	X	X
	Assure that flood management projects assess water quality impacts	-	X	X	X	X
	Implement control measures for discharges of pollutants from municipal waste storage facilities	-	X	X	X	X
	Require implementation of pollution prevention methods for municipal areas and activities	-	X	X	X	X
	Inventory all municipal areas and activities which generate pollutants	X	-	-	-	X
	Prioritize municipal areas and activities for oversight	-	X	-	-	X
	Require implementation of designated minimum BMPs for each municipal area or activity	-	X	X	X	X
	Require implementation of additional BMPs for municipal areas and activities tributary to Clean Water Act section 303(d) water bodies	-	X	X	X	X
	Implement a schedule of maintenance activities at all structural controls designed to reduce pollutant discharges to or from the MS4	X[18]	X	X	X	X

[18] The language in Order No. 90-42 regarding maintenance of the MS4 is broad. It states "Permittees shall, at all times, properly maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by a permittee to achieve compliance with the conditions of this Order." Staff interprets this language to apply to consistent periodic maintenance of the entire MS4. Therefore, all requirements regarding maintenance of the MS4 are "checked" for Order No. 90-42.

Requirement Category	Requirements	Order No. 90-42 (July, 1990)	Federal NPDES Regulations (November, 1990)	1995 Draft (May, 1995)	1998 Draft (October, 1998)	Tentative Order No. 2001-01 (October, 2000)
	Implement a schedule of maintenance for the MS4	X	X	X	X	X
	Inspect and remove waste accumulated in the MS4	X	-	X	X	X
	Perform additional MS4 cleaning as necessary	-	-	X	X	X
	Keep records of cleanings and quantity of material removed	-	-	-	X	X
	Dispose of MS4 waste properly	-	-	-	X	X
	Eliminate waste discharges during maintenance and cleaning	-	-	-	X	X
	Implement BMPs to reduce contribution of pollutants associated with the application, storage, and disposal of pesticides, herbicides, and fertilizers	-	X	X	X	X
	Inspect high priority municipal areas and activities annually	-	-	-	-	X
	Enforce storm water ordinance for all municipal areas and activities	X	X	X	X	X
Industrial (Section F.3.b., page 27 of Tentative Order No. 2001-01)	Reduce pollutants in runoff from industrial sites	X	X	X	X	X
	Require implementation of pollution prevention methods at industrial sites	-	X	X	X	X
	Inventory all industrial sites	X	X	X	X	X
	Prioritize industrial sites for oversight	-	X	X	X	X
	Require implementation of designated minimum BMPs for each industrial site	X	X	X	X	X
	Require implementation of additional BMPs for industrial sites tributary to Clean Water Act section 303(d) water bodies	-	X	X	X	X
	Require monitoring program for runoff from high priority industrial sites	-	X	-	X	X

Requirement Category	Requirements	Order No. 90-42 (July, 1990)	Federal NPDES Regulations (November, 1990)	1995 Draft (May, 1995)	1998 Draft (October, 1998)	Tentative Order No. 2001-01 (October, 2000)
	Inspect industrial sites for compliance with ordinances and permits	-	X	X	X	X
	Establish inspection frequencies for industrial sites based on their prioritization	-	X	X	X	X
	Inspect high priority industrial sites annually (or biannually if SWPPP has been reviewed and is found to have been implemented)	-	-	-	-	X
	Enforce ordinances at all industrial sites	X	X	X	X	X
	Provide notification to SDRWQCB of non-compliant sites	X	X	X	X	X
Commercial (Section F.3.c., page 30 of Tentative Order No. 2001-01)	Reduce pollutants in runoff from commercial sites	X	X	X	X	X
	Require implementation of pollution prevention methods at commercial sites	-	X	X	X	X
	Inventory all high priority commercial sites	X	-	X	X	X
	Require implementation of designated minimum BMPs for each commercial site	X	X	X	X	X
	Require implementation of additional BMPs for commercial sites tributary to Clean Water Act section 303(d) water bodies	X	X	X	X	X
	Inspect high priority commercial sites as needed	-	-	X	-	X
	Enforce ordinances at all commercial sites	X	X	X	X	X
Residential (Section F.3.d., page 31 of Tentative Order No. 2001-01)	Reduce pollutants in runoff from residential areas and activities	X	X	X	X	X
	Require implementation of pollution prevention methods for residential areas and activities	-	X	X	X	X
	Inventory all high priority residential areas and activities	X	-	-	X	X

Requirement Category	Requirements	Order No. 90-42 (July, 1990)	Federal NPDES Regulations (November, 1990)	1995 Draft (May, 1995)	1998 Draft (October, 1998)	Tentative Order No. 2001-01 (October, 2000)
	Require implementation of designated minimum BMPs for high priority residential areas and activities	X	X	X	X	X
	Require implementation of additional BMPs for residential areas and activities tributary to Clean Water Act section 303(d) water bodies	X	X	X	X	X
	Enforce ordinances for all residential areas and activities	X	X	X	X	X
Education (Section F.4., page 32 of Tentative Order No. 2001-01)	Implement a education program to increase knowledge of MS4s, impacts of urban runoff on receiving waters, and potential BMP solutions	-	X	X	X	X
	Implement education program to measurably change behavior of target communities	-	-	-	X	X
	Educate municipal departments and personnel	-	X	X	X	X
	Educate construction site owners and developers	-	X	X	X	X
	Educate industrial owners and operators	-	-	X	X	X
	Educate commercial owners and operators	-	-	X	X	X
	Educate residential community, general public, school children	-	-	X	X	X
	Educate quasi-governmental agencies	-	-	-	-	X
Illicit Discharge Detection and Elimination (Section F.5., page 34 of Tentative Order No. 2001-01)	Seek and eliminate illicit discharges and connections	X	X	X	X	X
	Conduct dry weather field screening of MS4 outfalls to detect illicit discharges and connections	X	X	X	X	-
	Conduct dry weather analytical monitoring of MS4 outfalls	-	-	-	-	X

Requirement Category	Requirements	Order No. 90-42 (July, 1990)	Federal NPDES Regulations (November, 1990)	1995 Draft (May, 1995)	1998 Draft (October, 1998)	Tentative Order No. 2001-01 (October, 2000)
	Follow-up on potential illicit discharges or connections based on dry weather analytical monitoring	-	X	X	X	X
	Establish criteria to identify where follow-up investigations appropriate	-	-	X	X	X
	Eliminate detected illicit discharges and connections	X	X	X	X	X
	Enforce ordinances, orders, and other legal authority to prevent and eliminate illicit discharges and connections	X	X	X	X	X
	Prevent and respond to sewage spills (including from private laterals) and other spills	X	X	X	X	X
	Develop and implement a mechanism to be notified of all sewage spills from private laterals	-	-	-	-	X
	Facilitate public reporting of illicit discharges and connections through operation of a public hotline	-	X	X	X	X
	Facilitate proper management and disposal of used oil, toxic materials, and other household hazardous wastes	-	X	X	X	X
	Implement controls and measures to limit infiltration of seepage from sanitary sewers to MS4s	-	X	X	X	X

Requirement Category	Requirements	Order No. 90-42 (July, 1990)	Federal NPDES Regulations (November, 1990)	1995 Draft (May, 1995)	1998 Draft (October, 1998)	Tentative Order No. 2001-01 (October, 2000)
Public Participation (Section F.6., page 35 of Tentative Order No. 2001-01)	Incorporate public participation into urban runoff management plan	-	X	-	X	X
Assessment of Urban Runoff Management Program Effectiveness (Section F.7., page 36 of Tentative Order No. 2001-01)	Develop and implement long-term strategy for assessing effectiveness of the urban runoff management program	X	X	X	X	X
	Assess status of compliance	-	-	-	-	X
Fiscal Analysis (Section F.8., page 36 of Tentative Order No. 2001-01)	Develop a strategy to conduct a fiscal analysis of the urban runoff management program	-	-	-	-	X
	Conduct fiscal analysis annually	X	X	X	X	X
Watersheds (Section J., page 41 of Tentative Order No. 2001-01)	Develop and implement a watershed urban runoff management program	-	X[19]	-	X	X
	Collaborate with other Copermittees in watershed and identify and mitigate highest priority water quality issues in the watershed	-	-	-	X	X
	Create a map of each watershed	-	-	-	X	X
	Assess water quality of all receiving waters in each watershed	-	X[20]	-	X	X
	Identify and prioritize water quality problems in each watershed caused by MS4 discharges	-	-	-	X	X

[19] The Federal NPDES regulations state "Proposed programs may impose controls on a [...] watershed basis [...]" (40 CFR 122.26(d)(2)(iv).
[20] The Federal NPDES regulations require an assessment of the quality of receiving waters (40 CFR 122.26(d)(1)(iv)(C)). If the urban runoff management program were to be conducted on a watershed basis, the water quality assessment would also be conducted on a watershed basis.

Requirement Category	Requirements	Order No. 90-42 (July, 1990)	Federal NPDES Regulations (November, 1990)	1995 Draft (May, 1995)	1998 Draft (October, 1998)	Tentative Order No. 2001-01 (October, 2000)
	Develop a time schedule of short and long-term recommended watershed activities	-	-	-	X	X
	Identify Copermittees and corresponding responsibilities for each watershed	-	-	-	X	X
	Develop a mechanism for public participation in watershed process	-	-	-	X	X
	Implement a watershed based education program	-	-	-	-	X
	Develop a mechanism to facilitate watershed-based land use planning between Copermittees	-	-	-	-	X
	Develop an implementation schedule for collaborative watershed-based land use planning	-	-	-	-	X
	Assess long-term effectiveness of watershed urban runoff management program	-	X[21]	-	X	X
Reporting (Sections H., I., L., and M., pages 36 – 44 of Tentative Order No. 2001-01)	Submit description of urban runoff management program	X	X	X	X	X
	Document all urban runoff activities and submit annually	X	X	X	X	X
	Submit description of watershed urban runoff management program	-	X[22]	-	X	X
	Document all watershed urban runoff activities and submit annually	-	X	-	X	X
	Submit report on dry weather monitoring results	X	X	X	X	X
	Submit monitoring report annually	X	X	X	X	X

[21] If an urban runoff management program is conducted on a watershed basis, the Federal NPDES regulations would require an assessment of the effectiveness of the watershed urban runoff management program.
[22] If an urban runoff management program is conducted on a watershed basis, a description of the watershed urban runoff management program would be required.

Requirement Category	Requirements	Order No. 90-42 (July, 1990)	Federal NPDES Regulations (November, 1990)	1995 Draft (May, 1995)	1998 Draft (October, 1998)	Tentative Order No. 2001-01 (October, 2000)
	All reports shall be signed and certified	X	X	X	X	X
Copermittee Collaboration (Section N., page 44 of Tentative Order No. 2001-01)	Collaborate with other Copermittees to address common issues, promote consistency, and coordinate activities	-	X	X	X	X
	Execute and submit an memorandum of understanding, joint powers authority, or other formal agreement between the Copermittees	X	X	X	X	X
	Execute and submit a memorandum of understanding, joint powers authority, or other formal agreement which provides a management structure for designation of joint responsibilities	X	-	X	X	X
	Execute and submit a memorandum of understanding, joint powers authority, or other formal agreement which designates fiscal responsibilities of Copermittees	X	-	-	X	-
	Execute and submit a memorandum of understanding, joint powers authority, or other formal agreement which provides a management structure for decision making	-	-	-	X	X
	Execute and submit a memorandum of understanding, joint powers authority, or other formal agreement which provides a management structure for watershed activities	-	-	-	-	X
	Execute and submit a memorandum of understanding, joint powers authority, or other formal agreement which provides a management structure for information management	-	-	-	X	X
	Jointly develop a standardized format for reports	-	-	-	X	X

Requirement Category	Requirements	Order No. 90-42 (July, 1990)	Federal NPDES Regulations (November, 1990)	1995 Draft (May, 1995)	1998 Draft (October, 1998)	Tentative Order No. 2001-01 (October, 2000)
Principal Permittee (Section O., page 45 of Tentative Order No. 2001-01)	Serve as a liaison between Copermittees and SDRWQCB	X	-	-	X	X
	Designate Principal Permittee	X	-	-	X	X
	Ensure coordination of permit activities among Copermittees	X	-	-	X	X
	Integrate individual Copermittee documents	X	-	-	X	X
Non-Compliance (Section R.1., page 49 of Tentative Order No. 2001-01)	Report all instances of non-compliance	X	X	X	X	X
Monitoring (Attachment B of Tentative Order No. 2001-01)	Develop a monitoring program	X	X	X	X	X
	Develop storm water monitoring program	X	X	X	X	X
	Develop urban runoff monitoring program	X	-	-	-	X
	Develop receiving water monitoring program	X	-	X	X	X
	Develop a report that summarizes previous monitoring results	X	-	-	-	X
	Develop a report that recommends future monitoring activities	-	-	-	-	X
	Estimate annual pollutant load of cumulative discharges	-	X	X	X	X
	Conduct urban stream bioassessment monitoring	-	-	-	-	X
	Conduct long-term mass loading monitoring	X	-	X	X	X
	Conduct coastal storm drain monitoring	-	-	-	-	X
	Conduct ambient bay, lagoon, and coastal receiving water monitoring	-	-	X	X	X
	Conduct toxic hot spot monitoring	-	-	X	X	X
	Conduct dry weather field screening	X	X	X	X	X
	Conduct dry weather analytical monitoring	-	-	-	-	X
	Develop map of MS4	X	X	X	X	X

Requirement Category	Requirements	Order No. 90-42 (July, 1990)	Federal NPDES Regulations (November, 1990)	1995 Draft (May, 1995)	1998 Draft (October, 1998)	Tentative Order No. 2001-01 (October, 2000)
Total Number of Requirements (estimate)	187	77	108	121	150	185
Total Number of Pages	-	33 (+ 3)	-	39 (+31)	26 (+17)	50 (+30)

S:storm\sdpermit\sdpermit99-01\december13 hearing\permits comparisondsj.doc