STATE WATER RESOURCES CONTROL BOARD
DIVISION OF WATER QUALITY

INFORMATIONAL DOCUMENT

PUBLIC SCOPING MEETING FOR THE PROPOSED AMENDMENT OF THE WATER QUALITY CONTROL PLAN FOR OCEAN WATERS OF CALIFORNIA

CALIFORNIA OCEAN PLAN

DECEMBER 2003

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State Water Resources Control Board

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NOTICE OF PUBLIC SCOPING MEETING

PROPOSED CALIFORNIA OCEAN PLAN AMENDMENTS

Friday, January 23, 2004 – 10:00 a.m.
Sierra Hearing Room – Second Floor
Joe Serna, Jr. Cal/EPA Headquarters Building
1001 "I" Street, Sacramento, CA 95814

NOTICE IS HEREBY GIVEN that the Division of Water Quality (DWQ), State Water Resources Control Board (SWRCB) will hold a public scoping meeting to seek input on the scope and content of the environmental information which should be included in the draft Functional Equivalent Document (FED) that will be prepared for the proposed amendments. This meeting originally was scheduled to be held on December 15, 2003. The four issues related to the proposed amendments are:

- Choice of Indicator Organisms for Water-Contact Bacterial Standards
- Establishing a Fecal Coliform Standard for Shellfish Harvesting Areas
- Reclassifying "Areas of Special Biological Significance (ASBS)" to "State Water Quality Protection Areas (SWQPAs)" and establishing implementation provisions for discharges into SWQPAs
- "Reasonable Potential:" Determining the likelihood that the concentration of a pollutant would cause or contribute to an exceedance of water quality standards

An audio broadcast of the meeting will be available via the internet and can be accessed at: http://www.calepa.ca.gov/broadcast/ . A teleconference line has also been arranged for members of the public to participate by phone. The conference line can accommodate a maximum of 30 callers. If there is an issue of significant importance to you or your organization, it is strongly recommended that a representative attend the meeting in Sacramento. The call-in number is (916) 227-1132.

AVAILABLILITY OF THE PROPOSED CALIFORNIA OCEAN PLAN AMENDMENTS

An informational document on the proposed California Ocean Plan amendments may be obtained via the Internet on the SWRCB web site at http://www.swrcb.ca.gov/plnspols/oplans/. You may also receive a copy by writing or calling: Jan Hisao, Division of Water Quality, State Water Resources Control Board, P.O. Box 100, Sacramento, CA 95812-0100, (916) 341-5568, FAX: (916) 341-5584, email: hisaj@dwq.swrcb.ca.gov.

SUBMISSION OF COMMENTS

DWQ will accept both written and oral suggestions on the scope and content of the environmental information which should be included in the FED. Comments should be limited to the four issues identified and help in identifying the range of actions, alternatives, mitigation measures, and potential significant effects to be analyzed in depth in the FED and in eliminating from detailed study issues found not to be important. Written comments should be submitted to: Frank Roddy, Division of Water Quality, State Water Resources Control Board, P.O. Box 100, Sacramento, CA 95812-0100, FAX: (916) 341-5584, email: roddf@dwq.swrcb.ca.gov.

PARKING AND ACCESSIBILITY

There is a parking garage across from the Joe Serna, Jr. Cal/EPA Building with entrances on 10th and 11th Streets between "I" and "J" Streets, and metered parking spaces are in the vicinity of the building. For a map, see our web site at http://www.calepa.ca.gov/EPABldg/location.htm. The facilities are accessible to persons with disabilities. Individuals who require special accommodations are requested to contact Adrian Perez at (916) 341-5880 at least five working days prior to the public scoping meeting date. Persons with hearing or speech impairments can contact us by using the California Relay Service Telecommunications Device for the Deaf (TDD). TDD is reachable only from phones equipped with a TDD Device. HEARING IMPAIRED RELAY SERVICE: TDD to voice 1-800-735-2929, Voice to TDD 1-800-735-2922.

All visitors are required to sign in and receive a badge prior to attending any meeting in the building. The Visitor and Environmental Services Center is located just inside and to the left of the Cal/EPA Building's public entrance. Valid picture identification may be required due to the security level. Please allow up to 15 minutes for receiving clearance to proceed to the Sierra Hearing Room.

Date: December 5, 2003

Division of Water Quality

Informational Document

Public Scoping Meeting for the Proposed Amendment of the Water Quality Control Plan for Ocean Waters of California

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LIST OF ABBREVIATIONS

ASBS	Areas of Special Biological Significance
BMP	Best Management Practice
CAO	Cleanup and Abatement Order
CAWD	Carmel Area Wastewater District
CCA	Critical Coastal Area
CCC	California Coastal Commission
CDO	Cease and Desist Order
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CV	Coefficient of Variation
CWA	U.S. Clean Water Act
CWC	California Water Code
DFED	Draft Functional Equivalent Document
DHS	Department of Health Services
DNQ	Detected but not quantified
EIR	Environmental Impact Report
FED	Functional Equivalent Document
FFED	Final Functional Equivalent Document
GLS	Great Lakes System
HSU	Humboldt State University
MAC	Microbiological Advisory Committee
µg/L	micrograms per liter
ml	milliliter
MLE	Maximum Likelihood Estimator
MP	Management Practice
MPN	Most Probable Number
MS4	Municipal Separate Storm Sewer System
ND	Non-detect
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NSSP	National Shellfish Sanitation Program
POTW	Publicly Owned Treatment Works
PRC	Public Resources Code
ROS	Regression on Order Statistics
RWQCB	Regional Water Quality Control Board
SCCWRP	Southern California Coastal Water Research Project
SWMP	Storm Water Management Plan/Program
SWPPP	Storm Water Pollution Prevention Plan
SWQPA	State Water Quality Protection Area
SWRCB	State Water Resources Control Board
TAC	Technical Advisory Committee
TMDL	Total Maximum Daily Load
TSD	Technical Support Document
USEPA	U.S. Environmental Protection Agency
WDR	Waste Discharge Requirement

INTRODUCTION

In July 1999, the State Water Resources Control Board (SWRCB) adopted Resolution 99-073 directing staff to review a series of high priority issues identified in the 1999-2002 Triennial Review Workplan (SWRCB 1999). Staff was further directed to make recommendations to the SWRCB for any necessary changes to the California Ocean Plan. The purpose of this report is to present staff recommendations for modification of some parts of the California Ocean Plan and solicit comments and suggestions on the scope and content of the environmental information which should be included in the draft Functional Equivalent Document (FED) that will be prepared for the proposed amendments. Assistance is requested in identifying the range of actions, alternatives, mitigation measures, and potential significant effects to be analyzed in depth in the FED and in eliminating from detailed study issues found not to be important. The four issues related to the proposed amendments are:

- Choice of Indicator Organisms for Water-Contact Bacterial Standards
- Establishing a Fecal Coliform Standard for Shellfish Harvesting Areas
- Reclassifying "Areas of Special Biological Significance (ASBS)" to "State Water Quality Protection Areas (SWQPAs)" and establishing implementation provisions for discharges into SWQPAs
- "Reasonable Potential:" Determining the likelihood that the concentration of a pollutant would cause or contribute to an exceedance of water quality standards

Background

The California Ocean Plan establishes water quality objectives for California's ocean waters and provides the basis for regulation of wastes discharged into the State's coastal waters. It applies to point and nonpoint source discharges. The SWRCB adopts the California Ocean Plan, and both the SWRCB and the six coastal Regional Water Quality Control Boards (RWQCBs) implement the California Ocean Plan.

Currently, the 2001 California Ocean Plan contains three chapters that describe beneficial uses to be protected, water quality objectives, and a program of implementation needed for achieving water quality objectives.

Chapter One of the California Ocean Plan identifies the applicable beneficial uses of marine waters. These uses include preservation and enhancement of designated Areas of Special Biological Significance (ASBS), rare and endangered species, marine habitat, fish migration, fish spawning, shellfish harvesting, recreation, commercial and sport fishing, mariculture, industrial water supply, aesthetic enjoyment, and navigation.

Chapter Two establishes a set of narrative and numerical water quality objectives designed to protect beneficial uses. These objectives are based on bacterial, physical, chemical, and biological

characteristics as well as radioactivity. The water quality objectives in Table B apply to all receiving waters under the jurisdiction of the California Ocean Plan and are established for protection of aquatic life and for protection of human health from both carcinogens and noncarcinogens. Within Table B there are 21 objectives for protecting aquatic life, 20 for protecting human health from noncarcinogens, and 42 for protecting human health from exposure to carcinogens.

Chapter Three is divided into nine sections: (A) General Provisions; (B) Table A Effluent Limitations; (C) Implementation Provisions for Table B; (D) Implementation Provisions for Bacterial Assessment and Remedial Action Requirements; (E) Implementation Provisions for ASBS; (F) Revision of Waste Discharge Requirements; (G) Monitoring Program; (H) Discharge Prohibitions; and, (I) State Board Exceptions to Plan Requirements. Section A provides the guidance needed to design systems for discharges into marine waters by listing the considerations a discharger must address before a new discharge is permitted. Section A also identifies how ASBS are designated and the application of U.S. Environmental Protection Agency's (USEPA's) Combined Sewer Overflow Policy.

Section B contains effluent limitations for protecting marine waters. The effluent limitations listed in Table A apply to all publicly owned treatment works (POTWs) and to industries that do not have effluent limitation guidelines established by the USEPA.

When a discharge permit is written, the water quality objectives for the receiving water are converted into effluent limitations that apply to discharges into State ocean waters. These effluent limitations are established on a discharge-specific basis depending on the initial dilution calculated for each outfall and the Table B objectives. Section C describes how Table B is to be implemented, including: calculation of effluent limitations; determination of mixing zones for acute toxicity objectives; toxicity testing requirements; selection of, deviations from, and use of minimum levels; sample reporting protocols; compliance determination; pollutant minimization program; and, toxicity reduction requirements.

Section D provides implementation provisions for bacterial assessment and remedial action requirements. The requirements provide a basis for determining the occurrence and extent of any impairment of beneficial use due to bacterial contamination, generate information which can be used to develop an enterococcus standard, and provide the basis for remedial actions necessary to minimize or eliminate any impairment of a beneficial use.

Sections E through I contain general provisions and sections on discharge prohibitions (e.g., municipal or industrial sludges, bypassing, discharges into ASBS, and others). The provisions mandate that the RWQCBs require dischargers to monitor their discharges. The provisions also provide mechanisms for allowing exceptions to the California Ocean Plan under special circumstances, provided that beneficial uses are protected and that the public interest is served.

History of the California Ocean Plan

The California Ocean Plan was first formulated by the SWRCB as part of the State Policy for Water Quality Control. Changes in the California Water Code (CWC) in 1972 required the SWRCB to redraft its proposed Policy as a Water Quality Control Plan. At that time, it was the intent of the

SWRCB to "…determine…the need for revising the Plan to assure that it reflects current knowledge…" (SWRCB 1972). The California Ocean Plan was reviewed and amended in 1978 to fulfill the intent of the SWRCB and the requirements of State and Federal law for periodic review (SWRCB 1978). In 1983, a second review and revision were completed (SWRCB 1983a). Major changes to the California Ocean Plan in 1983 included the addition of several chemicals to the receiving water limitations, modification of the bacterial standards, and incorporation of parts of the 1972 and 1978 guideline documents.

In 1986, the CWC was amended to require the SWRCB to review the California Ocean Plan at least once every three years and to develop toxicity bioassays for use in compliance monitoring of toxicity in whole effluents. The next triennial review was performed in 1987 and resulted in California Ocean Plan amendments in 1988 and 1990. The 1998 amendments (SWRCB 1998) changed several beneficial use designations to be consistent with the SWRCB's standard list, revised water quality objectives in Table B, established a uniform procedure for granting exceptions to California Ocean Plan objectives, and made several relatively minor changes.

The 1990 amendments (SWRCB 1990a; 1990b) added the following: (1) an appendix for standard monitoring procedures to implement California Ocean Plan requirements; (2) a bacterial monitoring requirement for enterococcus; (3) new and/or revised water quality objectives to Table B for protecting aquatic life and human health; (4) definitions of acute and chronic toxicity to replace previous definitions; (5) a chronic toxicity objective to Table B; (6) a section on measuring toxicity to the appendix for implementing the acute toxicity requirement in Table A and the chronic toxicity receiving water objective in Table B; and, (7) a list of seven critical life stage test protocols for use in measuring chronic toxicity.

Based on the 1992 Triennial Review, the SWRCB adopted a workplan that identified 24 high priority issues to be addressed (SWRCB 1992). The high priority issues fall into seven categories: (1) water quality objectives and regulatory implementation; (2) toxicity objectives and regulatory implementation; (3) bacterial standards; (4) administrative cleanup of California Ocean Plan format and terminology; (5) sediment quality objectives; (6) suspended solids regulation; and, (7) nonpoint source control. A detailed description of the issues is contained in the 1992 document *California Ocean Plan: Triennial Review and Workplan 1991-1994*.

In 1997, the SWRCB adopted two California Ocean Plan amendments relating to issues raised during the 1992 Triennial Review: (1) the list in Appendix II of test protocols used to measure compliance with the chronic toxicity objective was revised to reflect advances in conducting these tests, and (2) a number of minor changes were made to clarify and standardize terminology referring to water quality objectives and effluent limitations (SWRCB 1997a; 1997b).

Staff analysis and evaluation of the remaining high priority issues from the 1992 Triennial Review were carried over into the 1998-1999 Triennial Review, which also incorporated other issues. The SWRCB completed the 1998-1999 Triennial Review upon approval of the *California Ocean Plan 1999-2000 Triennial Review Workplan*. The 1999-2000 Triennial Review identified 22 high priority issues to be addressed, which fall into five categories: (1) applicability of the California Ocean Plan; (2) beneficial uses; (3) water quality objectives; (4) implementation; and, (5) format and organization of the California Ocean Plan (SWRCB 1999).

In 2000, the SWRCB adopted six California Ocean Plan amendments relating to issues raised during the 1999-2000 Triennial Review and incorporated them into the 2001 California Ocean Plan (SWRCB 2001). These issues include: (1) replacement of the acute toxicity effluent limit in Table A with an acute toxicity water quality objective; (2) revision of chemical water quality objectives for protection of marine life and human health; (3) compliance determination for chemical water quality objectives; (4) change the format of the California Ocean Plan; (5) development of special protection for water quality and designated uses in ocean waters of California; and, (6) administrative changes to the California Ocean Plan (SWRCB 2000; 2001). The 2001 California Ocean Plan became effective December 3, 2001 when it was approved by the USEPA (USEPA 2001).

CEQA Analysis and Impact of the Proposed Amendments

State agencies are subject to the environmental impact assessment requirements of the California Environmental Quality Act (CEQA) (Public Resource Code, §21000 *et seq*.). However, CEQA authorizes the Secretary of the Resources Agency to exempt specific State regulatory programs from the requirements to prepare Environmental Impact Reports (EIRs), Negative Declarations, and Initial Studies, if certain conditions are met (Public Resources Code, §21080.5). The Water Quality Control (Basin)/208 Planning Program (which includes the California Ocean Plan) of the SWRCB has been certified by the Secretary for Resources as a regulatory program (California Code of Regulations (CCR), Title 14, §15251(g)). As such, the plan, with supporting documentation, may be submitted in lieu of an EIR as long as the appropriate environmental information is contained therein (Public Resources Code, §21080.5(a)). Accordingly, the SWRCB prepares Functional Equivalent Documents (FEDs) in lieu of the more commonly used EIR. A Draft Functional Equivalent Document (DFED) is prepared by the agency and circulated for public review and comment. Responses to comments and consequent revisions to the information in the DFED are subsequently presented in a draft Final Functional Equivalent Document (draft FFED) for consideration by the SWRCB. After the SWRCB has certified the document as adequate, the title of the document becomes the Final FED (FFED).

Project Description

The CWC (§13170.2) requires that the California Ocean Plan be reviewed at least every three years to guarantee that the current standards are adequate and are not allowing degradation to indigenous marine species or posing a threat to human health.

This project, if approved by the SWRCB, will amend the 2001 California Ocean Plan. The following amendments are proposed for adoption:

Issue 1: Choice of Indicator Organisms for Water-Contact Bacterial Standard

Issue 2: Establishing a Fecal Coliform Standard for Shellfish Harvesting Areas

Issue 3: Reclassifying “Areas of Special Biological Significance (ASBS)” to “State Water Quality Protection Areas (SWQPAs)” and establishing implementation provisions for discharges into SWQPAs

Issue 4: "Reasonable Potential:" Determining the likelihood that the concentration of a pollutant would cause or contribute to an exceedance of water quality standards

Statement of Goals

To amend the California Ocean Plan by addressing certain high priority concerns introduced to the SWRCB in the 1999-2002 Triennial Review Workplan of the California Ocean Plan;

To update the California Ocean Plan based on a review of currently used methods and the best available scientific information; and,

To improve the California Ocean Plan by providing added clarification in definitions and terminology.

Proposed Project

The proposed project is the SWRCB adoption of the proposed amendments to the California Ocean Plan listed (above) in the Project Description.

Format Used in Issue Presentation

Each issue description and analysis contains the following sections:

Issue: A brief description of the issue.

Summary of Proposed California Ocean Plan Amendment: A summary of the proposed California Ocean Plan amendments related to the issue.

Present California Ocean Plan: A summary of the current California Ocean Plan provisions related to the issue.

Issue Description: A detailed description of the issue, plus the historical development of the current California Ocean Plan approach, and, if appropriate, a description of what led the SWRCB to establish the current provisions.

Staff Recommendation: For each issue, staff has prepared recommended changes to the California Ocean Plan.

Proposed California Ocean Plan: If appropriate, the wording of the proposed amendment is provided to indicate the exact change to the 2001 California Ocean Plan.

Issue 1: Choice of Indicator Organisms for Water-Contact Bacterial Standards

I. Summary of Proposed California Ocean Plan Amendment

Add an enterococcus water-contact standard, delete the single sample standard currently in the California Ocean Plan and change it to a trigger for additional monitoring. Require monitoring for only total coliform at offshore stations.

II. Present California Ocean Plan

Chapter II of the 2001 California Ocean Plan contains a total and fecal coliform water-contact standard, and a bacterial assessment and remedial action requirement that requires the measurement of enterococcus at all stations where total and fecal coliforms are sampled.

III. Issue Description

A. Background

In 1986, the U.S. Environmental Protection Agency (USEPA) recommended that states adopt an enterococcus standard for marine waters, based on epidemiological studies conducted in east coast waters. These studies supported enterococcus as a superior indicator of adverse human health effects as compared to total and fecal coliform bacteria. Like the coliform bacteria, enterococcus bacteria are a group of bacteria that are normally found in the gastrointestinal tract of warm-blooded animals. In their 2000 Draft Implementation Guidance for Ambient Water Quality Criteria for Bacteria, the USEPA strongly encourages States that have not already done so to adopt their 1986 recommendations, and to make the transition to their recommended indicator organisms during triennial review cycles occurring in FY 2000-2002. If a State does not adopt the USEPA's recommended bacteria water quality criteria during this period, the USEPA will promulgate federal water quality standards.

1. Indicator Organisms

   Because routine monitoring for all possible human disease-causing agents is impractical, indicator bacteria are used as an alternative to the measurement of pathogens with the assumption that high levels of the indicators imply the presence of fecal contamination. These indicators are not human specific: total coliform bacteria can exist on soil particles and plant surfaces, and fecal coliform and enterococci bacteria are normally found in the gastrointestinal tracts of warm-blooded animals. The adequacy of total and fecal coliform bacteria as indicators of human disease-causing organisms has been questioned for a number of years, especially with regard to their usefulness as predictors of non-bacterial pathogens, such as enteric viruses or protozoans. State Water Resources Control Board (SWRCB) staff had concerns that the correlations developed in the USEPA studies would not be applicable to the cooler California waters. To resolve the issue of which bacterial group would be a better indicator organism, the California Ocean Plan was amended in 1990 to require dischargers to measure enterococcus density at all stations where total and fecal coliform monitoring are required. Also, if a shore station consistently exceeded a coliform objective or exceeded a geometric mean enterococcus

density of 24 organisms per 100 ml for a 30-day period or 12 organisms per 100 ml for a six-month period, the Regional Water Quality Control Board (RWQCB) was to require the appropriate agency to conduct sanitary surveys. The intent of the 1990 amendment was twofold: the first goal was to determine what levels of enterococci could be expected in California marine waters and the second was to develop a data base with all three indicators measured concurrently. This information, in conjunction with the sanitary surveys, would illustrate which organism (and its associated numerical level), was a superior indicator of wastewater contamination for California use. Unfortunately, no sanitary surveys were conducted. The enterococcus monitoring requirement resulted in controversy because it was not uniformly enforced by the RWQCBs and because dischargers were required to bear the expense of monitoring for an additional indicator organism.

2. Review of the US EPA Guidance Document

As of April 1999, only 16 States have adopted the USEPA's recommended water quality criteria for *E. coli* and/or enterococci. In January 2000, the USEPA published their Draft Implementation Guidance for Ambient Water Quality Criteria for Bacteria – 1986. The purpose of this document is to reaffirm their conclusion that enterococcus demonstrates better correlation between swimming-associated illnesses in marine waters. In this document, the USEPA reviewed the original studies supporting their 1986 recommended water quality criteria as well as epidemiological studies conducted since 1984 (Table 1). In all, nine marine water epidemiological studies were reviewed. Of these, only four concluded that enterococcus provided the best correlation with gastrointestinal illness. One study (Cheung, *et al*. 1990) found *E. coli* to be the best indicator, another study (Balarajan, *et al*. 1991) did not specify what microorganisms were evaluated, and a third study (Von Schirnding, *et al*. 1992) did not find a statistically significant increase in the rate of illness between swimmers and non-swimmers. Corbett, *et al*. (1993) concluded that counts of fecal coliforms were better predictors of swimming-associated illness than fecal streptococci (of which enterococcus is a subset). The final study (Kueh, *et al*. 1995) did not analyze for enterococcus. As a result of this review, the USEPA concluded that "EPA has no new scientific information or data justifying a revision of the Agency's recommended 1986 water quality criteria for bacteria at this time".

3. Review of Additional Epidemiological Studies

Pruss (1998) reviewed a number of studies to assess several concerns: that certain symptoms may result from exposure to water itself rather than from microbiological water quality; that bather and non-bather groups may differ in their health status, which might influence their choice of beach activities; and, that non-swimmers may also be exposed to poor water by water-borne viruses that become airborne. To estimate each of these risk factors independently, the following associations were studied: (1) the incidence rates for swimming in relatively unpolluted water compared with the incidence rates of non-swimmers, to assess the risk of contact with water itself; and (2) the incidence rates for swimming in polluted water compared with the incidence rates of swimmers in relatively unpolluted water, to assess risk due to microbiological water quality.

Thirty-six epidemiological studies were initially reviewed, with 14 studies excluded because they met one or several of the following criteria: (1) the health outcomes are not clearly related to water quality; (2) the study only compares attack rates of swimmers in polluted water to attack rates of non-swimmers, and the associates of interest could not be calculated from the reported data; (3) the exposure or outcome assessment differs significantly among the exposure or outcome groups; (4) the study is not sufficiently documented for determining the association of interest; (5) the study population is too small; (6) the response rate is less than 50%; and (7) the water of exposure is chlorinated.

B. State Water Board Activity

1. Review of Discharger Data

An independent technical group, the Microbiological Advisory Committee (MAC) was formed in 1992 to advise SWRCB staff on the indicator organism issue. As a starting point, the MAC recommended a statistical analysis of two data sets which included concurrent measurement of all three indicators. A contract was initiated with the University of California, Berkeley in 1993, stipulating the following:

a. at each monitoring station, for each month and for each individual indicator organism, the number of times the measured level exceeded the allowable value contained in the California Ocean Plan was determined; and,

b. for each monitoring station, the density of indicator organisms were compared against each other and to physical parameters measured at the same time (water temperature, salinity, dissolved oxygen, etc.).

The contract also required that recent epidemiological studies be reviewed, summarized and related (if possible) to the discharger data analyses. Based on review of both discharger monitoring data and results of recent epidemiological studies, UC Berkeley was: (1) to make recommendations for possible revision of the California Ocean Plan water contact bacterial standards and (2) to identify areas in which additional research is necessary.

Because there was interest in the environmental fate of indicator organisms based on monitoring data taken over a time course of several years and under diverse environmental conditions, data from the City of San Diego and the City and County of San Francisco were analyzed. The study concluded that:

- when fecal contamination is present, all three indicators respond similarly;
- during less polluted periods, this relationship breaks down and the three indicator organisms vary independently;
- from a risk management perspective, the measurement of enterococcus levels seems to add little to the information provided by total and fecal coliform data,
- where there is increased likelihood of fecal contamination, enterococcus levels are well predicted by the fecal coliform measurement, and;

- based on these findings, the California Ocean Plan could revert to the pre-1990 bacterial monitoring requirements calling for total and fecal coliform only (Spear, *et al*. 1998).

2. Review of Recent Epidemiological Studies

As part of the UC Berkeley contract, five recent epidemiological studies were reviewed (Table 2). In general, these five studies consistently show that bathing at beaches where the water is contaminated by urban runoff, domestic wastewater discharges, or other swimmers, can lead to an increased risk of gastrointestinal and respiratory disorders, as well as ear, eye and skin infections in some circumstances. However, there is no consistent relationship between any one indicator and health endpoints. In a recent report, Fleisher, *et al*. (1996) concluded that even within a single study, different indicators predict different health endpoints and that "these findings argue against the use of a single illness or indicator organism in the establishment of marine standards for recreational water quality".

The Santa Monica Bay epidemiological study provides staff with critical information under local environmental conditions. This cohort study was conducted at three popular bathing beaches to investigate the possible adverse health effects of bathing in Santa Monica Bay and whether there are ill health effects associated with urban runoff from storm drains. Persons who bathed and immersed their heads in the ocean water were potential subjects. On the same days that subjects were recruited, morning water samples were collected at ankle depth at 0, 100 yards north and south of the storm drain, and 400 yards north or south of the drain, depending on current flow (this sample served as a control). Samples were analyzed for total and fecal coliforms, enterococci, and *E. coli*. In addition, one sample each Friday, Saturday, and Sunday was collected in the storm drain at each study beach and analyzed for enteric viruses.

The study was designed to investigate the following questions:

a. what are the relative risks of specific adverse health outcomes in subjects bathing at 0, 1-50, and 51-100 yards from a storm drain compared to subjects bathing at the same beach?

b. are risks of specific outcomes (*e.g*., highly credible gastrointestinal illness; ear, eye and sinus infections; upper respiratory infections; skin rashes and lesions) among subjects associated with levels of the bacterial or viral indicators?

Bacterial indicator results showed that:

- indicator counts were higher than in previous years;
- indicator counts were highly variable from day to day;
- for a substantial portion of the days, the counts exceeded the established cutoffs;
- the counts were generally higher in front of the drain and then dropped off with increasing distance from the drain; and,
- water samples taken at 400 yards were not always "clean", occasionally exceeding the established cutoffs.

The study concluded that distance from the storm drain, particularly swimming in front of the storm drains studied, is associated with an increased risk for a broad range of adverse health effects. A number of bacterial indicators, particularly the total to fecal coliform ratio when total coliform are above 1,000 organisms/100 ml, and enterococcus at levels above 104/100 ml, are associated with increased risk of adverse health effects.

Some of the criticism of this study focused on the finding that the total to fecal coliform proved to be a good indicator to adverse health effects. Critics stated that this was a site-specific finding only, and that the relationship would only hold true for samples taken directly in front of the drains. SWRCB staff asked for additional analysis in order to investigate if there were days when the ratio indicated adverse health affects but enterococcus did not (and conversely, when enterococcus indicated an adverse health affect, but the ratio did not). To address some of these questions, SWRCB staff asked the principal investigator three additional questions:

a. determine if the total to fecal ratio is an informative indicator of risk only in front of the storm drain;

b. determine if there are days that enterococcus is a better predictor of adverse health risk than the total to fecal ratio; and,

c. determine if the total to fecal ratio and the enterococcus densities move independently or do they correlate.

The answers to these questions are as follows:

a. The total to fecal coliform ratio (when restricted to days when the total coliforms exceeded 1,000 or 5,000) is still a useful predictor of risk even beyond the area in front of the drain.

b. The answer to this question is variable, depending on what cutpoint is used. Basically, there were days within the study when the total to fecal ratio predicted an adverse health problem, but enterococcus levels did not. The converse was also true.

c. Enterococcus was associated with increased risk of at least one health outcome (diarrhea with blood) independent of the total to fecal ratio. Even though this is a rare adverse health effect, it is one of the more severe effects looked for in the study.

3. Effect of Assembly Bill 411 on the California Ocean Plan Bacterial Standard Revision

Results from the Santa Monica Bay epidemiological study motivated the development of Assembly Bill 411 (AB 411) (Chapter 765, Statutes of 1997). This legislation required the Department of Health Services (DHS), in consultation with local health officers and the public, to establish minimum standards for the sanitation of public beaches. The regulation requires:

- testing of waters adjacent to all public beaches for total coliform, fecal coliform, and enterococci bacteria;
- standards to be set for total coliform, fecal coliform, and enterococci;

- establishment of sampling protocols; and
- weekly bacterial testing between April 1 and October 31 for any beach visited annually by more than 50,000 people which also has a storm drain outlet that flows in the summer.

The DHS developed regulations implementing AB 411, which were adopted in 1999. Although AB 411 and the resulting regulation pertain to county health agencies and not to the publicly-owned treatment works (POTW) dischargers covered under the California Ocean Plan, there is a common link. The California Ocean Plan's bacterial water contact standards and the DHS's regulation implementing AB 411 are intended to protect the health of persons engaged in water contact recreational activities. Also, some County Environmental Health agencies use the results of POTW sampling sites to assist in their beach water quality assessments. Because of this overlap, the SWRCB and the DHS agreed that monitoring requirements for beach stations should be the same.

C. Summary of Comments from the 1995 Public Hearings

The revision of the California Ocean Plan bacterial standards was identified as a high priority issue during the 1992 and 1999 Triennial Reviews. Staff received comments on this issue during a series of three public hearings held in 1995. The consensus of comments was that the SWRCB should make a choice as to which indicator organism(s) should be included in the California Ocean Plan for bathing water protection, and that this issue should remain a high priority. Most of the commenters felt that the SWRCB should not make a decision regarding indicator organism choices and standards until the DHS promulgates the AB 411 regulations, and that whatever decision the SWRCB makes should be consistent with the DHS regulations.

One commenter felt that we should remove the total and fecal coliform water-contact bacterial standards from the California Ocean Plan, and adopt enterococcus as the sole standard.

Four commenters recommended that the California Ocean Plan require monitoring for total and fecal coliform organisms only. After years of monitoring for total and fecal coliform, these groups strongly believe that enterococcus has never been helpful in terms of evaluating pollution events. Also, since most monitoring agencies test for total and fecal coliform, there is also a regional perspective for these indicator organisms. The Santa Monica Bay epidemiology study found the total coliform to fecal coliform ratio to be one of the better indicators for predicting health risks associated with swimming in ocean waters contaminated by urban runoff, and that enterococcus data add no further information. The total to fecal coliform ratio is also indicative of sewage contamination and is used to monitor sewage spills. Sampling and testing for enterococcus is cost prohibitive; it requires twice the testing media and almost twice the technician time of the other tests. A 48-hour waiting period is not conducive to making public health decisions regarding recreational water quality.

One discharger stated that, after collecting total and fecal coliform and enterococcus data for a number of years, they have found that their monitoring stations virtually never show significant contamination except from stormwater runoff. They also believe that the California Ocean Plan is an inappropriate device to mandate a data gathering effort, and that only a focused effort (such as an

epidemiological study) can lead to a conclusion of which indicator is the best suited for ocean water-contact recreation standards.

Six commenters recommended that the SWRCB add an enterococcus standard to the total and fecal coliform water-contact bacterial standards contained in the California Ocean Plan. One concern is that wastewater from Tijuana contains pathogens, and that fecal coliform is an inadequate indicator of pathogens. The SWRCB should make an effort to find superior alternate indicator organisms.

Another commenter stated that, in spite of the fact that dischargers feel that their effluent plumes do not make it back to shore, it would be a false economy to eliminate the enterococcus monitoring requirement. Approximately 80% of the beach monitoring programs in the Southern California Bight are conducted by National Pollutant Discharge Elimination System (NPDES) dischargers. POTW monitoring programs provide the public with critical information on beach water quality, and have become far more than effluent plume tracking efforts. They have become essential to the public right to know effort for water quality at California beaches. Further, the Santa Monica Bay epidemiology study demonstrated that enterococci densities greater than 104 MPN/100 ml were associated with incidences of diarrhea with blood. This association was completely independent from the total coliform to fecal coliform ratios. The risk of diarrhea with blood is approximately one in 175. At the public hearing held in Irvine, some dischargers used the results of the Spear, *et al*. (1998) study as rationale to eliminate the California Ocean Plan's enterococcus monitoring requirements. This commenter is concerned that the correlations used in determining the dependence of enterococcus densities on fecal and total coliform densities were misinterpreted. Also, the study was designed to focus on monitoring locations near POTW discharges. The results of this study should not be extrapolated to include analyses of beaches impacted by either dry or wet weather runoff. The SWRCB is asking the wrong question about indicator standards; we should be focusing on what standards would be most protective of public health. An enterococcus standard of 104 MPN/100 ml would be a health based standard.

The USEPA recommended that resolving the indicator organism question should be the highest priority for the 1998 Triennial Review, and strongly encourage the SWRCB to adopt enterococcus as it primary bacterial water quality object for contact recreational areas.

Several commenters stated that the California Water Code (CWC) §13170.2(b) requires that the California Ocean Plan standards must not "pos[e] a threat to human health". Because enterococcus has been associated with human health effects not necessarily identified by total and fecal coliform, excluding enterococcus from the California Ocean Plan would constitute a threat to human health.

One commenter stated that the recent studies "strongly suggest that there is a possibility that there is no single indicator organism for a water-contact bacterial standard, or that the choice of an appropriate indicator organism may be site-specific"... and that the SWRCB should not relax bacterial water quality numerical limits or reduce the selection of indicator organisms until such time as there is a clear consensus of scientific opinion regarding the most appropriate indicator organism for marine water-contact areas. Another commenter wrote that all three indicator organism groups have an appropriate place in assessing health risks to bathers in ocean water-contact areas. Consequently, monitoring programs should include analyses for all three bacterial groups.

One commenter further added that the wording in the California Ocean Plan regarding water-contact bacterial standards monitoring necessitates five sampling surveys each month. This caused logistical problems. To simplify sampling operations with little or no compromise on information, the California Ocean Plan should be changed to require sampling on a weekly basis, "...and not more than 20 percent of the samples at any sampling station, in any 5 consecutive week period, may exceed...". For weekly programs, this would result in 52 data values each year at each sampling site, eight less than if 60 surveys (five per month) were performed. This would still provide excellent information on trends of indicator bacteria and adherence to water quality objectives, while better utilizing monitoring resources.

Several comments pertained to the DHS's 1992 suggestion that the single sample fecal coliform standard be lowered to 200 MPN/100 ml from 400 MPN/100 ml. All commenters were opposed to this suggestion. One person wrote that, based on the Santa Monica Bay epidemiological study, fecal coliform bacterial levels alone did not correlate with illness. As a result, the fecal coliform standard should not be lowered. Another commenter stated that this issue should be deferred until a decision is made on which is the best indicator for bacterial contamination.

A suggestion was made that an epidemiological study and risk-analysis be done for the Monterey Bay region, patterned after the Santa Monica Bay study. This would better characterize the region and assist in the determination of an appropriate state-wide bacterial standard.

One commenter asked two questions: 1) will the SWRCB ever provide guidance on a sanitary survey methodology; and 2) will the SWRCB ever require the completion of a sanitary survey?

IV. Staff Recommendations

a. add an enterococcus standard to the California Ocean Plan;
b. delete the single sample standards currently in the California Ocean Plan and change it to a trigger for additional monitoring;
c. require monitoring for only total coliform at offshore stations;
d. require total and fecal coliform and enterococcus monitoring at all shoreline stations, and at stations determined by the RWQCBs to be used for water-contact recreation, including all kelp beds. It is a violation of bacterial standards at these stations if any of the three standards are exceeded;
e. amend Chapter II, section B (Bacterial Assessment and Remedial Action Requirements);

Since all comments opposed the suggestion that the single sample fecal coliform standard be lowered to 200 MPN/100 ml, this issue will be dropped.

V. Proposed Ocean Plan Amendment

Presented below are the proposed changes to the 2001 California Ocean Plan that will result if *only* the changes proposed in Issue 1 are approved.

1. Chapter II, B. Bacterial Characteristics, 1. Water-Contact Standards, page 4, revise water quality objectives.

B. Bacterial Characteristics

1. Water-Contact Standards

a. Within a zone bounded by the shoreline and a distance of 1,000 feet from the shoreline or the 30-foot depth contour, whichever is further from the shoreline, and in areas outside this zone used for water contact sports, as determined by the Regional Board, but including all kelp* beds, the following bacterial objectives shall be maintained throughout the water column:

~~(1) Samples of water from each sampling station shall have a density of total coliform organisms less than 1,000 per 100 ml (10 per ml); provided that not more than 20 percent of the samples at any sampling station, in any 30-day period, may exceed 1,000 per 100 ml (10 per ml), and provided further that no single sample when verified by a repeat sample taken within 48 hours shall exceed 10,000 per 100 ml (100 per ml).~~

~~(2) The fecal coliform density based on a minimum of not less than five samples for any 30 day period, shall not exceed a geometric mean of 200 per ml nor shall more than 10 percent of the total samples during any 60-day period exceed 400 per ml.~~

30-day Geometric Mean - The following standards are based on the geometric mean of the five most recent sample results from each site:

i. Total coliform density shall not exceed 1,000 per 100 ml;
ii. Fecal coliform density shall not exceed 200 per 100 ml; and,
iii. Enterococcus density shall not exceed 35 per 100 ml.

2. Chapter III, D. Implementation Provisions for Bacterial Assessment and Remedial Action Requirements, page 19, delete the section and add the following section:

~~D. Implementation Provisions for Bacterial Assessment and Remedial Action Requirements~~

~~1. The requirements listed below shall be used to determine the occurrence and extent of any impairment of a beneficial use due to bacterial contamination, generate information which can be used in the development of an enterococcus standard, and provide the basis for remedial actions necessary to minimize or eliminate any impairment of a beneficial use.~~

~~a. Measurement of enterococcus density shall be conducted at all stations where measurement of total and fecal coliforms are required. In addition to the~~

~~requirements of Chapter II.B.1, if a shore station consistently exceeds a coliform objective or exceeds a geometric mean enterococcus density of 24 organisms per 100 ml for a 30-day period or 12 organisms per 100 ml for a six-month period, the Regional Board shall require the appropriate agency to conduct a survey to determine if that agency's discharge is the source of the contamination. The geometric mean shall be a moving average based on no less than five samples per month, spaced evenly over the time interval. When a sanitary survey identifies a controllable source of indicator organisms associated with a discharge of sewage, the Regional Board shall take action to control the source.~~

~~b. Waste discharge requirements shall require the discharger to conduct sanitary surveys when so directed by the Regional Board. Waste discharge requirements shall contain provisions requiring the discharger to control any controllable discharges identified in a sanitary survey.~~

D. Implementation Provisions for Bacterial Characteristics

1. Water-Contact Monitoring

a. Weekly samples should be collected from each site during each 30-day period. The geometric mean shall be calculated using the five most recent sample results.

b. If a single sample exceeds any of the following densities, repeat sampling at that location will be conducted daily to determine the extent and persistence of the exceedance. Repeat sampling will be conducted until the sample result is less than the following densities:

i) Total coliform density will not exceed 10,000; or
ii) Fecal coliform density will not exceed 400 per 100 ml; or
iii) Total coliform density will not exceed 1,000 per 100 ml when the ratio of fecal/total coliform will not exceed 0.1;
iv) enterococcus density will not exceed 104 per 100 ml.

When repeat sampling is required because of an exceedance of any one single sample density, values from all samples collected during that 30-day period will be used to calculate the geometric mean.

c. For monitoring stations outside of the defined water-contact recreation zone but in areas determined by the Regional Board to be used for water-contact recreation, samples will be analyzed for total coliform.

Table 1-1: Studies conducted since 1984 reviewed by the US EPA in support of their 1986 recommended water quality criteria (taken from US EPA (2000))

Researcher	Year	Location	Microorganisms Evaluated	Relevant Findings
Fattal *et al*.	1987	Israel	Fecal coliforms Enterococci *E. Coli*	• Enterococci were the most predictive indicator for enteric disease symptoms.
Cheung *et al*.	1990	Hong Kong	Fecal coliforms *E. Coli* *Klebsiella* spp Enterococci Fecal streptococci Staphylococci *Pseudomonas aeruginosa* *Candida albicans* Total fungi	• Best relationship between a microbial indicator and swimming-associated health effects was between *E. coli* and highly credible gastorintestinal illness.
Balarajan *et al*.	1991	United Kingdom	Unknown	• Risk of illness increased with degree of exposure. If the non-exposed population risk ranked at 1, risk increased to 1.25 for waders, 1.31 for swimmers, and 1.81 in surfers or divers.
Von Schirnding *et al*.	1992	South Africa (Atlantic coast)	Enterococci Fecal coliforms Coliphages Staphylococci F-male-specific bacteriophages	• Uncertainty in sources of fecal contamination may explain lack of statistically significant rates of illness between swimmers and non-swimmers.
Corbett *et al*.	1993	Sydney, Australia	Fecal coliforms Fecal streptococci	• Gastrointestinal symptoms in swimmers did not increase with increasing counts of fecal bacteria. • Counts of fecal streptococci were worse predictors of swimming-associated illness than fecal coliforms.
Kay *et al*.	1994	United Kingdom	Total coliforms Fecal coliforms Fecal streptococci *Pseudomonas aeruginosa* Total staphylococci	• Only fecal streptococci were associated with increased rates of gastroenteritis. • Risk of gastroenteritis did not increase until bathers were exposed to about 40 fecal streptococci per 100 ml.

Table 1-1 (Cont.)

Kueh *et al*.	1995	Hong Kong	*E. coli* Fecal coliforms Staphylococci *Aeromonas* spp *Clostridium perfringens* *Vibrio cholera* *Vibrio parahemotylicus* *Salmonella* spp *Shigella* spp	• Also analyzed stool specimens for rotavirus, Salmonella spp, Shigella spp, Vibrio spp, and Aeromonas spp; throat swabs for Influenza A and B; Parainfluenza Virus types 1, 2, and 3; and Respiratory Syncytial Virus, and Adenovirus. • Did not find a relationship between *E. coli* and swimming-associated illness [possibly due to low number of beaches sampled (only two)].
McBride *et al*	1998	New Zealand	Fecal coliforms *E. coli* Enterococci	• Enterococci were most strongly and consistently associated with illness risk for the exposed groups. • Risk differences significantly greater between swimmers and non-swimmers if swimmers remained in water more than 30 minutes.
Haile *et al*.	1996	California, USA	Total coliforms Fecal coliforms Enterococci *E. coli*	• Results for enterococci indicate positive associations with fever, skin rash, nausea, diarrhea, stomach pain, coughing, rummy nose, and highly credible gastrointestinal illness. • Association of symptoms with both *E. coli* and fecal coliforms were very weak. • Total coliform to fecal coliform ratio very informative -–below the cutpoint of 5.0, diarrhea and highly credible gastorintestinal illness were associated with a lower ratio regardless of the absolute level of fecal coliforms.

Table 1-2: Recent epidemiological studies of disease outcomes and bacterial risk indices among individuals exposed to marine waters during recreational activity

Reference	Location	Water Sampling	Bacterial Indicators Measured	Indicator Correlation	Time of Follow-up	Health Endpoint(s)	Best Risk Predictor
Cheung *et al* 1990	Hong Kong	3 fixed sample pts every 2 hrs on interview days, 1 m depth	Fecal Coliform Fecal strep *E. coli* *Klebsiella* Enterococci Staphylococci *Pseudomonas* *Candida*	High (≈0.5-0.9) for fecal coliform, fecal strep, *E. coli* and enterococci	7-10 days	GI, HCGI, eye, ear, respiratory, skin	*E. coli* for HCGI and skin; dose-response Staph for ear and throat
Corbett *et al*. 1993	Australia	Day swam AM-PM Beach Center	Fecal coliform Fecal strep	Not reported	7-10 days	GI, respiratory, eye, ear	Fecal coliform (except GI)
Kay *et al*. 1994, Fleisher *et al*. 1993	Britain	3 depths at bather location, within 10 min. of exposure	Total coliform Fecal coliform Fecal strep *Pseudomonas* Total staph (partial)	Not reported	7 days (medical exam) and 21 days (questionnaire)	GI	Fecal strep dose-response
Fleisher *et al*. 1996 (Same data set as Kay *et al*. used to study different health endpoints)	Britain	3 depths at bather location, within 10 min. of exposure	Total coliform Fecal coliform Fecal strep *Pseudomonas* Total staph (partial)	Not reported	7 days (medical exam) and 21 days (questionnaire)	Respiratory, eye, ear, skin	Fecal strep for respiratory; fecal coliform for ear; dose-response
Haile *et al*. 1996	Santa Monica	Daily at 3 locations per beach; ankle depth, 8-11 AM	Total coliform Fecal coliform *E. coli* Enterococci	Not reported	9-14 days	GI, HCGI, eye, ear, respiratory, skin	Each indicator for different symptom complex

Issue 2: Adoption of Fecal Coliform Standard for Shellfish Harvesting Areas

I. Summary of Proposed California Ocean Plan Amendment

Change the water quality objective for shellfish harvesting standards from total coliform to fecal coliform.

II. Present California Ocean Plan

Chapter II of the 2001 California Ocean Plan contains a total coliform water quality standard for all areas where shellfish may be harvested for human consumption.

III. Issue Description

In 1992, the Department of Health Services (DHS) suggested that the California Ocean Plan be amended to add a fecal coliform standard of 14 organisms per 100 mL for waters of all areas where shellfish may be harvested for human consumption. The addition of a fecal coliform standard would make the California Ocean Plan consistent with the National Shellfish Sanitation Program (NSSP) guidelines for commercial shellfish growing areas. Although the NSSP allows the regulating agency to use either total coliform or fecal coliform to regulate commercial shellfish growing areas, changing the California Ocean Plan shellfish water quality standard from total coliform to fecal coliform would make the California Ocean Plan consistent with recreational and commercial shellfish growing water requirements of other coastal states, and consistent with California's regulations for commercial shellfish growing waters.

The U.S. Environmental Protection Agency (USEPA), in their 2002 Draft Implementation Guidance for Ambient Water Quality Criteria for Bacteria, continues to recommend the use of fecal coliform to protect shellfishing waters (USEPA 2002). The USEPA states that "If, at such time, data and information are compiled that support the use of these indicators (enterococcus and *Escherichia coli*) in shellfishing waters, the USEPA will revisit this issue and consider the development of a revised criterion that appropriately takes into account the exposure pathways associated with the consumption of shellfish. In the meantime, the USEPA continues to recommend the use of fecal coliforms for the protection of shellfishing waters."

IV. Staff Recommendations

Staff has identified three possible approaches to this issue:

1. Do not change the Ocean Plan. This would leave the total coliform standard in place for all waters where shellfish are harvested for human consumption.

2. Establish a fecal coliform standard of 14 organisms per 100 ml for shellfish harvesting waters. Work with RWQCB staff to determine how to revise their monitoring programs to ensure that the standard is being met.

3. Establish a fecal coliform standard of 14 organisms per 100 ml for shellfish harvesting waters and provide a compliance schedule to allow coastal RWQCBs to evaluate water bodies for which shellfish harvesting is listed as a beneficial use and to revise their designations if needed.

Issue 3: Reclassifying "Areas of Special Biological Significance (ASBS)" to "State Water Quality Protection Areas (SWQPAs)" and establishing implementation provisions for discharges into SWQPAs

I. Summary of Proposed California Ocean Plan Amendment

The proposed amendment to the California Ocean Plan would change the names and references from Areas of Special Biological Significance (ASBS) to State Water Quality Protection Area (SWQPAs), and would define the terms "limited by special conditions" and "controlled to the extent practicable" as they relate to point sources and nonpoint sources respectively.

II. Present California Ocean Plan

The California Ocean Plan prohibits the discharge of waste into ASBS, except under certain temporary situations having the approval of the Regional Water Quality Control Board (RWQCB).

III. Issue Description

A. Historical Background

Since the State Water Resources Control Board's (SWRCB's) approach to regulating discharges to ASBS has evolved over time, a review of the pertinent history is provided below.

The 1972 California Ocean Plan states: "Waste shall be discharged a sufficient distance from areas designated as being of special biological significance to assure maintenance of natural water quality conditions in these areas" (SWRCB 1972). No ASBS had yet been designated in 1972.

The SWRCB decided that: "The list of Areas of Special Biological Significance will be used to identify for planning purposes, those areas where the regional water quality control boards will prohibit waste discharges from all sources controlled within the authority of the Temperature Control Plan, recognizing that the California Ocean Plan is not applicable to vessel wastes, the control of dredging, or the disposal of dredging spoil" (SWRCB 1974a). Thirty one ASBS were designated at that time, and in a related action, as directed by the SWRCB (SWRCB 1974b), the Executive Director revised Section XI of the Water Quality Administrative Procedures Manual. Included were the following provisions developed by the Executive Director in 1974 regarding discharges to ASBS:

> "a. Discharge of elevated temperature wastes in a manner that would alter water quality conditions from those occurring naturally will be prohibited.
>
> b. Discharge of discrete, point source sewage or industrial process wastes in a manner that would alter water quality conditions from those occurring naturally will be prohibited.
>
> c. Discharge of waste from nonpoint sources, including but not limited to storm water runoff, silt and urban runoff, will be controlled to the extent practicable. In control programs for waste from

> nonpoint sources, Regional Boards will give high priority to areas tributary to ASBS." (SWRCB 1974c)

Later in 1974, two more ASBS were designated (SWRCB 1974d), and another in 1975 (SWRCB 1975). There are currently a total of 34 ASBS.

The 1978 amendments to the California Ocean Plan did not change the ASBS language in the discharge prohibitions chapter. The 1978 amendments did, however, clarify the applicability of the California Ocean Plan. The 1978 version stated that it was applicable in its entirety to point source discharges to the ocean; however, nonpoint source discharges were subject only to specified chapters, including the discharge prohibitions chapter.

In 1983 the SWRCB made the discharge provisions related to the ASBS more specific by prohibiting discharges within the ASBS, in contrast to the 1972 requirement that "Waste shall be discharged a sufficient distance from" ASBS. Therefore the 1983 California Ocean Plan was amended to read: "Waste shall not be discharged to areas designated as being of special biological significance. Discharges shall be located a sufficient distance from such designated areas to assure maintenance of natural water quality conditions in these areas" (SWRCB 1983a)

It appears that the original intent of absolutely prohibiting discharges into ASBS was aimed at thermal discharges (under the Thermal Plan), sewage treatment facilities, and industrial point sources. In 1974, urban storm water runoff was considered a form of nonpoint source pollution to be controlled to the extent practicable. The 1978 and 1983 California Ocean Plan amendments, in effect, prohibited all discharges, both point and nonpoint source, to ASBS.

In 1987 the U.S. Clean Water Act (CWA) was amended to specifically address permit requirements for storm water as point source discharges. Since 1987, the SWRCB has also considered urban storm water runoff, subject to National Pollutant Discharge Elimination System (NPDES) permit requirements, to be a point source discharge.

The 2001 California Ocean Plan retains the same prohibition on discharges as in the 1983 and subsequent versions of the California Ocean Plan. However, a new provision was added to address temporary discharges, as follows:

> "Regional Boards may approve waste discharge requirements or recommend certification for limited-term (*i.e.*, weeks or months) activities in ASBS*. Limited-term activities include, but are not limited to, activities such as maintenance/repair of existing boat facilities, restoration of sea walls, repair of existing storm water pipes, and replacement/repair of existing bridges. Limited-term activities may result in temporary and short-term changes in existing water quality. Water quality degradation shall be limited to the shortest possible time. The activities must not permanently degrade water quality or result in water quality lower than that necessary to protect existing uses, and all practical means of minimizing such degradation shall be implemented" (SWRCB 2001)

Over the years the SWRCB has authorized four discharges to ASBS, pursuant to the SWRCB's exception authority in the current and prior California Ocean Plans. The 2001 California Ocean Plan,

for example, allows the SWRCB to grant exceptions to the plan's provisions, including the ASBS discharge prohibition, provided that the exception will not compromise protection of ocean waters for beneficial uses and the public interest will be served.

B. Recent State Legislation

Assembly Bill 2800 (Chapter 385, Statutes of 2000), the Marine Managed Areas Improvement Act, was approved by the Governor on September 8, 2000. This law added sections to the Public Resources Code (PRC) that are relevant to ASBS. Section 36700 (f) of the PRC now defines a state water quality protection area as "a nonterrestrial marine or estuarine area designated to protect marine species or biological communities from an undesirable alteration in natural water quality, including, but not limited to, areas of special biological significance that have been designated by the State Water Resources Control Board through its water quality control planning process." Section 36710 (f) of the PRC states: "In a state water quality protection area point source waste and thermal discharges shall be prohibited or limited by special conditions. Nonpoint source pollution shall be controlled to the extent practicable. No other use is restricted." The change in terminology from ASBS to SWQPA went into effect on January 1, 2003 (without Board action) pursuant to Section 36750 of the PRC.

C. SWRCB Order WQ 2001-08, Irvine Coast ASBS (Crystal Cove)

On November 16, 2000, the Santa Ana RWQCB issued a cease and desist order (CDO) to the Irvine Company, the California Department of Transportation (Caltrans), and the California Department of Parks and Recreation. The CDO contains findings that the dischargers were violating or threatening to violate the discharge prohibition contained in the California Ocean Plan against discharges to the Irvine Coast ASBS. Caltrans petitioned the SWRCB to review the CDO. On April 26, 2001 the SWRCB decided Caltrans was in violation of the California Ocean Plan ASBS discharge prohibition in that:

- there are waste discharges from Pacific Coast Highway,
- discharges on the beach above the high tide line do constitute discharges to the ASBS,
- the California Ocean Plan does in fact regulate the discharge of wastes through storm water conveyances, and
- coverage under Caltrans' statewide NPDES permit for storm water discharges does not relieve the discharger from complying with the California Ocean Plan prohibitions on discharges into the ASBS.

The SWRCB did amend the CDO to allow submission of a discharge elimination plan by May 16, 2002 and to require the cessation of discharges by November 16, 2003.

D. Discharges into ASBS/SWQPAs

SWRCB hearings on California Ocean Plan amendments and the Caltrans petition brought to light the fact that there are storm water and nonpoint source discharges into ASBS/SWQPAs, despite the California Ocean Plan prohibition. The SWRCB decided in 2001 to fund a study to assess the extent of storm water and nonpoint source discharges into ASBS/SWQPAs. The SWRCB contracted with

the Southern California Coastal Water Research Project (SCCWRP) to conduct a pilot project survey of the ASBS/SWQPAs in southern California. Upon completion of that work, the SWRCB again contracted with SCCWRP to expand the survey to all ASBS/SWQPAs in California. This statewide survey was completed and in July of 2003 SCCWRP issued its *Final Report: Discharges into State Water Quality Protection Areas* (SCCWRP 2003). Information gained from the study was to be used to guide future action on these discharges.

For the purposes of this survey, all drainages were divided into outlets and discharges. Outlets were defined as naturally occurring water bodies (*e.g.*, perennial or ephemeral streams and naturally occurring gullies) that drain to an ASBS/SWQPA. Discharges were defined as anthropogenic sources that drain to an ASBS/SWQPA. Statewide, there were 1658 direct discharges into ASBS/SWQPAs. These discharges were further classified into 31 wastewater discharge points, 391 municipal/industrial storm drains, 1012 small storm drains (*e.g.*, from individual properties), and 224 nonpoint sources. In addition, 182 seeps were also identified as draining into ASBS/SWQPAs. Of these, SCCWRP identified 66 that were potential nonpoint sources of pollutants.

The survey was originally designed to identify storm water and nonpoint source discharges, which collectively represent about 98% of the discharges identified. However, one side benefit of this survey was that several wastewater point source discharges to ASBS/SWQPAs were identified that either are not permitted or are permitted without an California Ocean Plan exception. Thirty-one wastewater discharge points were identified. Some facilities have multiple discharge points, and subsequently staff has identified 13 facilities that discharge wastewater to ASBS/SWQPAs. Of these, only four are properly covered by permits and exceptions. The remaining nine facilities are in violation of the California Ocean Plan. Three of these do have current permits (but not exceptions) and six are lacking current permits.

The following briefly describes some of the results of the survey on a regional basis and also provides information concerning the water quality status of the ASBS/SWQPAs in those regions.

In the North Coast Region (RWQCB 1) seven of the eight ASBS/SWQPAs are located at or near the mouths of streams that are located in watersheds which do not meet water quality standards. For one example, Redwood Creek and the Klamath River flow into Redwood National Park ASBS/SWQPA. The Klamath River is 303(d) listed for nutrients and organic enrichment/low dissolved oxygen from both point source (including storm water) and nonpoint sources, and temperature from non-point sources. Redwood Creek is 303(d) listed for sedimentation/siltation from nonpoint sources. Redwood National Park ASBS/SWQPA also has a total of 41 direct discharges. The National Park Service wastewater treatment plant at Requa discharges onto a steep slope immediately above the Redwood National Park ASBS/SWQPA; this discharge is currently not permitted, nor does it have an exception from the California Ocean Plan. There are 17 direct discharges into the Kings Range National Conservation Area ASBS/SWQPA. The community of Shelter Cove's wastewater treatment plant discharges into the Kings Range National Conservation Area ASBS/SWQPA under an NPDES permit and an exception from the California Ocean Plan.

Also in RWQCB 1, the Bodega Marine Laboratory discharges treated return seawater into the Bodega Marine Life Reserve ASBS/SWQPA under an NPDES permit, but without the benefit of an exception from the California Ocean Plan. The Humboldt State University (HSU) Marine

Laboratory discharges combined storm water and seawater into the ASBS/SWQPA at Trinidad Head; this discharge is currently not permitted, nor does it have an exception from the California Ocean Plan. The City of Trinidad's storm water system also discharges to the ASBS/SWQPA at the same point as the discharge from HSU Lab. The base of the bluffs at Trinidad has 29 groundwater seeps, many of which drain as rivulets across the beach and into the ASBS/SWQPA; the residents and businesses in Trinidad are currently entirely on septic systems, which may be contributing pollutants to those groundwater seeps. A seasonal mooring field located at Trinidad has nonpoint source impacts, and a fish cleaning station on the Trinidad pier discharges untreated fish offal into the ASBS/SWQPA.

In the San Francisco Bay Region (RWQCB 2), there are 28 direct discharges and 3 natural outlets draining into the James V. Fitzgerald Marine Reserve ASBS/SWQPA, located immediately north of and bordering Half Moon Bay. This ASBS/SWQPA is 303(d) listed due to high coliform bacteria levels. One of the natural outlets into the James V. Fitzgerald Marine Reserve ASBS/SWQPA is San Vicente Creek, which is also 303(d) listed due to high coliform bacteria counts from nonpoint sources. The sparsely manned research facility at the Farallon Islands ASBS/SWQPA discharges raw liquid human waste without an NPDES Permit or an exception from the California Ocean Plan. Bird Rock ASBS/SWQPA is located approximately one half mile from the mouth of Tomales Bay, which is 303(d) listed for metals, nutrients, pathogens and sediment, all from nonpoint sources.

In the Central Coast Region (RWQCB 3), a cove in the Julia Pfeiffer Burns Underwater Park ASBS/SWQPA has been completely filled with sediment, resulting from a landslide onto Highway 1 and possibly accelerated by associated Caltrans road clearance work. Two small wastewater dischargers are south of and relatively close in proximity to the Point Lobos Ecological Reserve ASBS/SWQPA. Specific data about these discharges were not included in the SCCWRP Discharge Survey since they were greater than 100 meters outside of the ASBS/SWQPA boundary. However, these dischargers have historically had trouble in complying with their permit conditions and plans are currently underway to divert their flows into the Carmel/Pebble Beach wastewater treatment plant. There are 348 direct discharges into the Carmel Bay ASBS/SWQPA. The Carmel Area Wastewater District (CAWD) plant discharges secondary treated wastewater into the Carmel Bay ASBS/SWQPA, but this discharge has an NPDES permit and an exception from the California Ocean Plan. There are 246 direct discharges into the Pacific Grove/Hopkins Marine Life Refuge ASBS/SWQPA; this ASBS/SWQPA is located in the southern portion of Monterey Bay, which is 303(d) listed for metals. The Hopkins Marine Laboratory discharges seawater into the ASBS/SWQPA following use in the laboratory; this discharge is currently not permitted, nor does it have an exception from the California Ocean Plan. The Monterey Bay Aquarium also discharges its return seawater just outside of but immediately to the north of the Pacific Grove/Hopkins ASBS/SWQPA. Año Nuevo Point and Island ASBS/SWQPA is located immediately adjacent to agricultural operations that apply pesticides, some of which may enter the ASBS/SWQPA through runoff or aerial deposition. The RWQCB has issued a Cleanup and Abatement Order (CAO) to the National Park Service (NPS) on Santa Rosa Island, which is surrounded by an ASBS/SWQPA. The CAO was issued in 1996 and requires the NPS to implement a road management plan (to reduce erosion and related sediment discharges). The NPS has not yet complied with the CAO.

In the Los Angeles Region (RWQCB 4) there were 410 direct discharges into the Mugu Lagoon to Latigo Point ASBS/SWQPA, the largest number for any of the ASBS/SWQPAs. This

ASBS/SWQPA is in the greater Santa Monica Bay, which is 303(d) listed for a variety of pollutants from both point sources (including storm water) and nonpoint sources. Specific beaches at this ASBS/SWQPA are also 303(d) listed for high coliform count and beach closures related to nonpoint source pollution. This ASBS/SWQPA receives storm water and non-storm water runoff discharged under the Los Angeles County MS4 Permit. In Ventura County, Calleguas Creek (including its estuary, Mugu Lagoon), a 303(d) listed water body, flows through the mouth of Mugu Lagoon into the west end of the Mugu Lagoon to Latigo Point ASBS/SWQPA. The U.S. Navy also discharges under the general industrial storm water NPDES permit into Mugu Lagoon, which then in turn flows into the ASBS/SWQPA.

Two other U.S. Navy facilities, also in RWQCB 4, have permitted wastewater point source discharges (with exceptions), and permitted industrial storm water discharges (under the general permit). These are located at San Nicolas and San Clemente Islands. The University of Southern California Wrigley Institute on Santa Catalina Island discharges return seawater into the ASBS/SWQPA under an NPDES permit, but without the benefit of an exception from the California Ocean Plan. Nearby, the town of Two Harbors on Catalina discharges storm water into the ASBS/SWQPA; a pier and mooring facilities at Two Harbors potentially contribute nonpoint source pollutants as well. Also on Santa Catalina Island, a large coastal rock quarry discharges runoff into the ASBS/SWQPA.

In the Santa Ana Region (RWQCB 8) there are a total of 18 discharge points and three natural outlets identified along the coast of the Newport Beach Marine Life Refuge ASBS/SWQPA. One of those outlets is Buck Gully Creek, which is 303(d) listed because it does not meet standards for fecal or total coliform bacteria. There are a total of 16 discharge points and 16 natural outlets identified in the Irvine Coast Marine Life Refuge ASBS/SWQPA, which is partially in the RWQCB 8 (northern portion) and partially in the RWQCB 9 (southern portion). The Irvine Coast Marine Life Refuge ASBS/SWQPA is inclusive of the coast of Crystal Cove State Park. One of the steams draining into the Irvine Coast Marine Life Refuge ASBS/SWQPA, Los Trancos Creek, is 303(d) listed because it does not meet fecal coliform bacteria standards.

In the San Diego Region (RWQCB 9), 14 discharges and 1 natural outlet drain into the Heisler Park Ecological Reserve ASBS/SWQPA; the shoreline at Heisler Park Ecological Reserve ASBS/SWQPA is 303(d) listed because it does not meet water quality standards for bacterial indicators. There are 92 discharges into the San Diego Marine Life Refuge ASBS/SWQPA and 184 discharges into the San Diego-La Jolla Ecological Reserve ASBS/SWQPA. The shorelines of the San Diego Marine Life Refuge ASBS/SWQPA and the San Diego-La Jolla Ecological Reserve ASBS/SWQPA are also 303(d) listed because they do not meet water quality standards for bacterial indicators. The Scripps Institute and its Stephen Birch Aquarium discharge return seawater into the San Diego Marine Life Refuge ASBS/SWQPA under an NPDES permit, but without the benefit of an exception from the California Ocean Plan; this discharge has on occasion exceeded the copper limits in the 2001 California Ocean Plan.

Considering all of this information five general types of drainages are evident:

1. **Perennial and ephemeral streams, and estuaries, that may carry point and nonpoint source pollutants and flow into an ASBS/SWQPA.**

   Upstream discharges into natural streams and estuaries are subject to regulation by RWQCBs under the applicable Basin Plan, through Waste Discharge Requirements (WDRs), waivers of WDRs, or prohibitions. Impaired natural streams and their estuaries will be addressed through Total Maximum Daily Loads (TMDLs) developed by the RWQCBs. In regulating these upstream discharges, the RWQCBs must ensure that downstream water quality standards are met. Downstream standards include the 2001 California Ocean Plan prohibition on discharges to ASBS/SWQPAs. (SWRCB 2001)

2. **Permitted storm water discharges.**

   There are 391 municipal or industrial storm drains that empty directly into ASBS/SWQPAs statewide. None of these storm drains are covered under an exception from the 2001 California Ocean Plan's ASBS discharge prohibition. Storm water discharges from Phase I and Phase II Municipal Separate Storm Sewer Systems (MS4s), industrial facilities, and certain construction activities are considered point source wastes and are therefore issued NPDES permits. Various Phase I MS4 permittees have discharges directly into all mainland ASBS/SWQPAs in coastal southern California (RWQCBs 4, 8, and 9), and in San Mateo County (RWQCB 2) as well. There are Phase II MS4 discharges into certain ASBS/SWQPAs in Monterey County (Carmel and Pacific Grove, both in RWQCB 3), and depending on the applicability of the Permit, in Marin County (Bolinas in RWQCB 2), Sonoma County (Sea Ranch in RWQCB 1) and Humboldt County (Shelter Cove and Trinidad, also in RWQCB 1). State Highway 1 and US Highway 101, operated by Caltrans under a statewide NPDES storm water permit, are located adjacent to and discharge into many of the ASBS/SWQPAs. Statewide general permits also are currently in effect for industrial and construction related storm water discharges. The US Navy discharges under the statewide industrial storm water NPDES permit into ASBS/SWQPAs at San Nicolas Island and San Clemente Island in RWQCB 4.

   Section 36710(f) of the PRC states that point source waste discharged into SWQPAs shall be prohibited or "limited by special conditions." These "special conditions" should be defined in the amendments to the 2001 California Ocean Plan, with regard to direct NPDES-permitted storm water discharges, to assure adequate protection to SWQPAs.

3. **Point source discharges that are not storm water-related but are covered by permits and exceptions**

   Under the 2001 California Ocean Plan, point source discharges to ASBS/SWQPAs are allowed only if the SWRCB grants an exception to the discharge prohibition. Of the 13 point source dischargers that are not storm water-related, currently only four have NPDES permits and have been granted California Ocean Plan exceptions contingent upon compliance with permit conditions. These are at San Clemente Island (RWQCB 4), San Nicolas Island (RWQCB 4),

Carmel (RWQCB 3), and Shelter Cove (RWQCB 1). The discharges at San Clemente Island and San Nicolas Island have been in violation of certain permit conditions or limitations.

Section 36710(f) of the PRC states that point source waste discharged into SWQPAs shall be prohibited or "limited by special conditions." These "special conditions" should be defined in the amendments to the 2001 California Ocean Plan, with regard to direct point source NPDES permitted discharges with exceptions.

4. Point source discharges that are not storm water-related and that lack exceptions from the California Ocean Plan prohibition, and, in some cases, permits.

Nine facilities have been identified that discharge wastewater to ASBS/SWQPAs without the benefit of an exception. These nine facilities are in violation of the California Ocean Plan. Of these, there are three waste seawater discharges from marine laboratories that have been issued permits, but do not possess exceptions from the SWRCB. These are:

- UC Davis Bodega Marine Lab (RWQCB 1);
- USC Wrigley Institute on Santa Catalina Island (RWQCB 4); and,
- UC San Diego Scripps Institute (RWQCB 9).

The discharge from the Scripps Institute is in violation of the California Ocean Plan copper limits.

Six other discharges into (or immediately adjacent to) ASBS/SWQPAs have neither a permit nor an exception. These are:

- National Park Service wastewater treatment discharge at Requa (RWQCB 1);
- HSU Marine Laboratory combined storm water and waste seawater at Trinidad (RWQCB 1);
- Fish cleaning station on Trinidad Pier (RWQCB 1);
- US Fish and Wildlife Service untreated liquid human waste and gray water at the Farallon Islands (RWQCB 2);
- Hopkins Marine Lab waste seawater (RWQCB 3); and,
- Monterey Bay Aquarium waste seawater, discharging immediately adjacent to an ASBS/SWQPA (RWQCB 3).

Specifically for marine laboratories and public aquaria, there are really two concerns associated with their discharges. The first has to do with the chemical quality of their wastewater, and its potentially toxic or bioaccumulative effect on marine species in an ASBS/SWQPA. The second is less obvious and has to do with the potential for these discharges to introduce pathogens or exotic species into an ASBS/SWQPA. For example, the UC Bodega Marine Laboratory includes a pathology laboratory. For this reason that wastewater is disinfected prior to discharge. This is the only marine laboratory at an ASBS/SWQPA that disinfects its wastewater on a regular, controlled basis.

RWQCB 3 has plans to include the Hopkins Laboratory and the Monterey Bay Aquarium discharge under its general NPDES permit for aquaculture facilities. SWRCB staff is currently

working with other RWQCB staff and the dischargers to bring the marine research facilities into compliance, including requesting exceptions from the SWRCB.

Again, Section 36710(f) of the PRC states that point source waste discharged into SWQPAs shall be prohibited or "limited by special conditions." These "special conditions" should be defined in the amendments to the 2001 California Ocean Plan, with regard to direct point source NPDES permitted discharges that require exceptions.

In addition, discharges into ocean waters in proximity to an ASBS/SWQPA must "be located a sufficient distance from such designated areas [ASBS/SWQPAs] to assure maintenance of natural water quality conditions in these areas" (SWRCB 2001). Hence, permits for discharges to ocean waters outside of, but in proximity to, an ASBS/SWQPA must also ensure that standards are met within that ASBS/SWQPA. There are two NPDES permitted discharges for treated wastewater located in the Highlands area south of Carmel, in close proximity but outside the Point Lobos Ecological Reserve ASBS/SWQPA in RWQCB 3. These discharges at times have been in violation of their permits, and may have impacted water quality within the Point Lobos ASBS/SWQPA.

Plans are in progress to reduce pollution by diverting the Highlands waste streams to the Carmel wastewater treatment plant. The Carmel treatment plant has a larger capacity and is a well maintained full secondary facility; much of the treated wastewater from the Carmel plant is tertiary treated and recycled as irrigation water. The diverted Highlands waste streams are rather small in comparison to the flows handled by the Carmel plant. By diverting the smaller Highlands waste streams to the Carmel treatment plant the overall pollutant levels in the Carmel and Point Lobos ASBS/SWQPAs will be reduced. If these plans are fully implemented and these discharges are eliminated, then no additional action would be necessary for these two discharges.

5. Nonpoint source discharges.

There were 224 nonpoint sources draining into (or immediately adjacent to) ASBS/SWQPAs statewide. These were found to be from a variety of activities, including surface mining (quarrying), agriculture, grazing, parking lots and roads, boat yards, boat moorings, piers, runoff from leach fields, potentially faulty septic systems and other activities. Additionally, 66 seeps were identified that were also potential nonpoint sources of pollutants.

Also included here with nonpoint sources of pollution are urban/residential surface runoff from individual homes, and clusters of homes or structures (and associated landscaped areas) that are not subject to regulation under an MS4 NPDES Permit. Statewide, there are a total of 1012 of these "small" storm drains not covered under a permit that discharge to an ASBS/SWQPA.

The SWRCB and California Coastal Commission's (CCC) (2000) *Plan for California's Nonpoint Source Pollution Control Program* (NPS Program Plan) identifies pollutant source categories and applicable management measures. The State is committed to implementing these management measures by 2013. The NPS Program Plan, through the Critical Coastal Area

(CCA) designation, directs its attention to "Coastal Areas of Special Biological Significance" when addressing management measure implementation.

In accordance with the NPS Program Plan, SWRCB and RWQCB staff participate in the CCA Committee, chaired by the staff of the CCC. The purpose of the CCA Committee is to identify critical coastal areas needing protection from nonpoint source pollution and to encourage the implementation of watershed management plans in those areas on a priority basis. All of the shoreline, and tributary watersheds within the coastal zone, of the ASBS/SWQPAs have been included on the list of CCAs by that committee. For purposes of the CCA program, the coastal environment has been divided into four zones as follows: 1) north coast; 2) San Francisco Bay and adjacent nearshore ocean coast; 3) central coast; and, 4) south coast. The CCA Committee, during June and July of 2003, conducted several public meetings, entitled Information Exchange Forums, in each of these zones to determine the priorities for developing watershed management plans in CCAs.

Section 36710(f) of the PRC states that nonpoint sources of pollution discharging to SWQPAs must be "controlled to the extent practicable." For direct discharges of nonpoint source pollution, including storm water runoff not subject to an NPDES permit, "controlled to the extent practicable" should be defined in the amendments to the 2001 California Ocean Plan to assure adequate protection of SWQPAs.

E. Summary

The 2001 California Ocean Plan prohibits discharges into ASBS, with the exception of vessel wastes, or wastes associated with dredging. The SCCWRP survey of discharges into ASBS has documented a large number of direct point source and nonpoint source discharges. Therefore it is clear that the prohibition on discharges into ASBS has not been uniformly enforced. Furthermore, according to the PRC as amended by AB 2800, ASBS have now been reclassified as SWQPAs. In SWQPAs, point source discharges are prohibited or must be limited by special conditions, and nonpoint source pollution must be controlled to the extent practicable. Precipitation is a naturally occurring phenomenon. Runoff from land surfaces due to storm events and/or human activities will continue to occur into the ocean in SWQPAs. In order to reconcile this situation, a practical strategy is needed to implement the requirements of the Public Resources Code while eliminating pollutants from directly entering SWQPAs, primarily via NPDES-permitted storm water runoff and nonpoint source runoff.

IV. Staff Recommendations

The following issue descriptions and alternatives are provided according to the types of direct discharges into SWQPAs:

A. Discharges authorized under an NPDES Storm Water Permit

1. Present State Policy:

The 2001 California Ocean Plan prohibits all discharges into ASBS, with the exception of vessel wastes, or wastes associated with dredging.; however, these prohibited discharges can be allowed pursuant to an exception. Section 36710(f) of the PRC provides that all point source waste discharges into SWQPAs must be prohibited or limited by special conditions. Storm water discharges from Phase I and Phase II MS4s, industrial facilities, and certain construction activities are considered point source waste discharges.

2. Issue Description:

SWQPAs are those areas designated by the SWRCB that require protection of species or biological communities to the extent that alteration of natural water quality is undesirable. The marine biological communities in SWQPAs are intended to be protected from wastewater pollutants because of their value or fragility. For this reason point source waste discharges are generally prohibited in SWQPAs. Runoff from storm water conveyances has been known to be toxic and often contains pathogens and other pollutants as well. Even though polluted runoff can adversely impact marine communities, the prohibition on these discharges has not been uniformly enforced.

Phase I MS4 storm water dischargers, which are generally those within metropolitan areas having populations in excess of 100,000, are now permitted by RWQCBs throughout the state. Phase I permits in San Mateo (RWQCB 2), Los Angeles (RWQCB 4), Orange (RWQCBs 8 and 9), and San Diego Counties (RWQCB 9) regulate discharges into SWQPAs without the benefit of an exception from the SWRCB. A Phase II MS4 general permit was adopted in April of 2003 to cover certain designated municipalities serving populations of under 100,000 people. Discharge to sensitive water bodies (*e.g.*, ASBS/SWQPAs) is one of the factors to consider when evaluating a municipality's designation status. There are Phase II MS4 discharges (without the benefit of an exception) into certain SWQPAs in Monterey County (Carmel and Pacific Grove, both in RWQCB 3), and depending on the applicability of the Permit, in Marin County (Bolinas in RWQCB 2), Sonoma County (Sea Ranch in RWQCB 1) and Humboldt County (Shelter Cove and Trinidad, also in RWQCB 1). Caltrans currently operates under a statewide permit covering both municipal and construction related storm water discharges. Highways 1 and 101 are located adjacent to and in many cases discharge into SWQPAs (without the benefit of an exception). Statewide general permits also are currently in effect for industrial and construction related storm water discharges. The U.S. Navy discharges into SWQPAs, without an exception, under the general industrial storm water NPDES permit at San Clemente and San Nicolas Islands.

The MS4 NPDES permits issued by the SWRCB and RWCQBs envision an iterative approach using Best Management Practices (BMPs) to achieve standards. The dischargers are required to develop storm water management programs, which among other things identifies the BMPs that will be implemented to reduce or eliminate pollutants. BMPs are defined in 40 CFR 122.2 as "schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of waters of the United States. BMPs also include treatment requirements, operating procedures, and practices to control runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage." In other words BMPs may include non-structural (*e.g.* public education, regulatory powers, urban

planning, etc.) and structural (*e.g*. detention basins, grass swales, runoff infiltration devices, etc.) controls.

It is important to note that none of the individual or general permits described above expressly allows discharges into ASBS/SWQPAs at the present time. Nor do these permits address specific restrictions or conditions relative to discharges into ASBS/SWQPAs. Generally, little or no monitoring is specifically required in the ASBS/SWQPAs into which municipal storm water is discharged. The only enforcement action taken specifically for storm water discharges into ASBS/SWQPAs by a RWQCB has been the CDO issued by RWQCB 8 and upheld by the SWRCB. As described above, that CDO stated that coverage under Caltrans' statewide NPDES permit for storm water discharges does not relieve the discharger from complying with the California Ocean Plan prohibitions on discharges into the ASBS/SWQPAs.

3. Staff Recommendation:

Amend the 2001 California Ocean Plan to establish the special conditions, pursuant to Section 36710(f) of the PRC, under which discharges authorized by an NPDES storm water permit will be allowed. The amendment would include minimum requirements for discharges authorized under NPDES storm water permits that discharge to SWQPAs that would be addressed through a discharger's Storm Water Management Plan/Program or Storm Water Pollution Prevention Plan.

This involves amendments to the California Ocean Plan that will modify the discharge prohibition for point source stormwater discharges into SWQPAs; these amendments would allow discharges authorized by an NPDES storm water permit under a set of restrictive conditions. In order to accomplish this, staff recommends defining "limited by special conditions" by requiring a combination of provisions and prohibitions exceeding those that would normally be required for permitted discharges outside of SWQPAs. This would be consistent with PRC Section 36710 (f) which allows discharges into SWQPAs that are "limited by special conditions."

Included in this definition of "special conditions" are a prohibition on new discharge points, a prohibition on non-storm water discharges through storm water conveyance systems (that are not otherwise authorized), the use of an accelerated iterative process specifically implemented on management practices that address discharges into SWQPAs, and specific monitoring requirements.

No discharges from new outlets will be allowed. Permitted storm water discharges, regardless of the effective date of inclusion under or issuance of the permit, will be allowed as long as their outlets were constructed prior to the effective date of these amendments. This should not be interpreted as a ban on new development adjacent to SWQPAs. Permitted discharges from new development would be allowed if such development connected to existing outlets (*i.e*., those installed prior to the effective date), even if those outlets were modified. In other words, storm water conveyances with existing points of discharge could be modified, within the limits of good engineering practices and environmental considerations, and using appropriate control measures (*e.g*., standard urban storm water mitigation plans) to accommodate the additional flow from new development. Alternatively, if permitted discharges from new outlets are deemed to meet the

criteria in Chapter III(I) of the California Ocean Plan (*i.e.*, that the discharge will not compromise the protection of ocean waters for beneficial uses, and the public interest will be served), then the discharger may petition the SWRCB for an exception. Therefore, while the prohibition on permitted storm water discharges from new outlets may in some cases result in some limits on growth, such limits would not constitute an absolute ban.

Non-storm water discharges (dry weather flows) through storm water conveyances can contribute significant flows and pollutants and can include landscape irrigation overflow, groundwater pumping, illicit dumping, illicit connections, individual car wash water and other discharges. Non-storm water discharges, except those associated with emergency fire fighting, would be prohibited into SWQPAs. Implementation of this prohibition will be within three years of the effective date of the amended California Ocean Plan. Dischargers would be required to specifically address the prohibition of non-storm water discharges into SWQPAs in their Storm Water Management Plan/Program (SWMP) for MS4 dischargers or Storm Water Pollution Prevention Plan (SWPPP) for industrial storm water dischargers. The SWMP or SWPPP would describe the measures by which non-storm water discharges would be ultimately prevented from entering a SWQPA, and interim measures that will be employed to reduce non-storm water flows until the ultimate measures are implemented.

Storm water (wet weather) runoff would not be permitted to cause or contribute to an exceedance of the California Ocean Plan's water quality objectives. To accomplish this we propose an iterative process with an accelerated schedule (as compared to non-SWQPA permit areas). All dischargers would be required to submit their revised SWMP or SWPPP to the RWQCB within six months of the effective date of the approved amendments. The SWMP or SWPPP must address discharges into SWQPAs, and how pollutants will be reduced in runoff entering these SWQPAs through the implementation of BMPs. The BMPs will be described in the SWMP or SWPPP with a schedule for implementation. The SWMP or SWPPP would be subject to the approval of the RWQCB. The schedule must be developed to ensure BMPs are implemented as soon as practicably possible.

If the results of water quality monitoring indicate discharges are causing or contributing to exceedance(s) of applicable water quality objectives, the discharger would be required to submit a report to the RWQCB within 30 days. That report must describe BMPs that are currently being implemented, BMPs that are planned for in the SWMP or SWPPP, and additional BMPs that may be added to the SWMP or SWPPP. The report shall include an implementation schedule. The RWQCB may require modifications to the report. Within 30 days following approval of the report by the RWQCB, a discharger would then revise its SWMP or SWPPP to incorporate any new or modified BMPs that have been and will be implemented, the implementation schedule, and any additional monitoring required. So long as the dischargers have complied with the procedures described above and are implementing the revised SWMP or SWPPP, the dischargers do not have to repeat the same procedure for continuing or recurring exceedances of the same water quality objective unless directed by the RWQCB to develop additional BMPs.

Effluent and receiving water monitoring results are valuable in evaluating source reduction of toxic pollutants. Monitoring results can also be used to develop and adjust management plans where necessary, implement additional source controls and other best management practices to reduce the discharge of the pollutants, and determine compliance with water quality objectives.

Effluent and receiving water monitoring are being recommended in the draft amendments to the California Ocean Plan. Minimum monitoring would include effluent flow measurements, visual observations for trash, and receiving water monitoring of chronic toxicity, indicator bacteria analysis, measurements of bioaccumulative impacts through chemical analysis of mussel (*e.g.*, mussel watch) or sand crab tissue analysis, and an intertidal and/or subtidal benthic community analysis. These minimum monitoring requirements would not preclude the SWRCB or RWQCBs from imposing additional monitoring requirements as well. For example, for those dischargers operating under the general industrial storm water NPDES permit, they would also be required to conduct the effluent monitoring required under that permit in addition to the monitoring requirements being proposed herein.

Chronic toxicity tests on critical life stages of three kinds of marine organisms (fish, invertebrate, and plant species) on receiving water samples would be required during a minimum of two storm events. Except for the minimum sampling from two storms for chronic toxicity testing, the RWQCB would determine all other sample number, frequency, locations, and monitoring details. In making determinations regarding sample number, sampling frequency, sample locations, and other monitoring details the RWQCB would consider the size and characteristics of the watershed contributing to the discharges. The RWQCB would also have the option to relieve the permittee of receiving water self-monitoring requirements (with the exception of chronic toxicity) if the permittee provides support to a regional monitoring program that includes the applicable receiving waters and indicator bacteria, tissue chemistry, and benthic community components.

B. Permitted Point Source Discharges that are not storm water-related with an Exception

1. Present State Policy:

The 2001 California Ocean Plan generally prohibits permanent point source discharges into ASBS. However Section III (I) of the 2001 California Ocean Plan, "State Board Exceptions to Plan Requirements" states that: " 1. The State Board may, in compliance with the California Environmental Quality Act, subsequent to a public hearing, and with the concurrence of the Environmental Protection Agency, grant exceptions where the Board determines: a. The exception will not compromise protection of ocean* waters for beneficial uses, and, b. The public interest will be served." The PRC Section 36710(f) provides that these discharges will be prohibited or limited under special conditions.

2. Issue Description:

There are currently four discharges with exceptions from the California Ocean Plan's ASBS discharge prohibition. Three of these are for wastewater treatment plant discharges and one is for a desalination brine effluent discharge. There are three additional waste seawater discharges from marine laboratories that have been issued permits from RWQCBs, but do not possess exceptions from the SWRCB. One of these discharges appears to violate the California Ocean Plan copper objectives. Five other discharges into SWQPAs have neither a permit nor an exception. The discharges are: 1) waste sea water; 2) combined storm water and waste sea water; 3) fish cleaning wastes; 4) treated human waste; and, 5) untreated liquid human waste and gray

water. According to the 2001 California Ocean Plan, discharges into ocean waters in proximity to an ASBS/SWQPA must "be located a sufficient distance from such designated areas [ASBS/SWQPAs] to assure maintenance of natural water quality conditions in these areas." A sixth waste seawater discharge is located immediately adjacent to the Pacific Grove SWQPA, also without a permit and an exception.

For those discharges that have permits, the monitoring requirements are quite inconsistent. For example, the Carmel wastewater discharge has more comprehensive monitoring requirements than some other wastewater discharges into ASBS/SWQPAs. The existing permits for marine lab waste sea water discharges do not have any required monitoring for marine biota in the vicinity of the discharge, and therefore there is inadequate on-going documentation that these discharges are not degrading water quality. Those discharges without permits do not have any monitoring data at all.

SWQPAs are those areas designated by the SWRCB that require protection of species or biological communities to the extent that alteration of natural water quality is undesirable. The marine biological communities in SWQPAs are intended to be protected from water pollution because of their value or fragility. Effluent from sewage treatment facilities can include toxic and other pollutants. Storm water wastes co-mingled with marine laboratory waste seawater can contribute additional pollutants into an SWQPA. Untreated human waste and gray water, even in small waste streams, obviously contains pathogens and other pollutants. Waste sea water from marine laboratories can contain additives that are toxic, such as copper sulfate used to treat marine aquaria (*e.g.*, for disease or parasite control), or residual chlorine added to treat the discharge for pathogens. Such discharges may also have the potential to introduce pathogens or exotic species into a SWQPA. All of these discharges have the potential to adversely impact water quality and marine communities in the SWQPAs.

3. Staff Recommendation:

Amend the California Ocean Plan to clearly state that a point source discharge that is not storm water-related and that has been granted an exception by the SWRCB is "limited by special conditions," and is, therefore, allowed into an SWQPA. Also amend the requirements for effluent and receiving water monitoring to ensure that permitted discharges into SWQPAs (with exceptions) meet more stringent requirements than other wastewater discharges. Permitted wastewater point source discharges that have been granted an exception from the SWQPA/ASBS discharge prohibition must then comply with all permit provisions, and the additional monitoring requirements recommended herein. These permitted discharges would clearly be "limited by special conditions," and, hence, comply with PRC Section 36710(f).

Monitoring requirements for these point source discharges should be consistent throughout the state and provide meaningful information about the status of water quality and marine life in the vicinity of the discharges. Staff recommends amending the requirements for effluent and receiving water monitoring to assure that such discharges into SWQPAs must meet more stringent requirements than other wastewater discharges. Minimum effluent monitoring would include flow measurements and analysis for Table B constituents. Minimum receiving water monitoring would include monitoring of bioaccumulative toxicants in the discharge zone, as

determined by the chemical analysis of mussel tissue (*e.g*., mussel watch) or sand crab tissue, and an intertidal and/or subtidal benthic community analysis. In addition, for facilities that discharge or treat human waste, receiving water monitoring would also include indicator bacteria analysis.

The number of samples, sampling frequency, locations of sampling points, and other monitoring details will be determined by the RWQCB. In making determinations regarding sample number, frequency, locations, and other monitoring details the RWQCB would consider the flow and other characteristics of the facility contributing to the discharges. These minimum monitoring requirements would not preclude the RWQCB from imposing additional monitoring requirements as well. The RWQCB would also have the option to relieve the discharger of the receiving water monitoring components of an individual monitoring program, if the discharger provides support to a regional monitoring program that includes the applicable receiving waters and indicator bacteria (as applicable), tissue chemistry, and benthic community components.

C. Nonpoint Source Discharges, including non-permitted storm water discharges

1. Present State Policy:

The 2001 California Ocean Plan prohibits all permanent nonpoint source discharges; however they can be allowed pursuant to an exception and the issuance of Waste Discharge Requirements (WDRs). RWQCBs have various waivers, with conditions, that allow certain nonpoint source discharges, but not specifically into SWQPAs. The SWRCB has issued no exceptions for any nonpoint source covered by a WDR. Section 36710(f) of the PRC states that "[n]onpoint source pollution shall be controlled to the extent practicable."

The State has a NPS Program Plan that identifies pollutant source categories and applicable management measures. Management measures serve as general goals for the control and prevention of polluted runoff. The State is committed to implementing these management measures by 2013. Dischargers typically implement management measures by selecting appropriate management practices (MPs). A variety of MPs are discussed in the guidance document written by the USEPA and the National Oceanic and Atmospheric Administration (NOAA) (USEPA 1993) to assist states in complying with the Coastal Zone Act Reauthorization Amendments of 1990. The NPS Program Plan has specific goals of targeting and implementing program activities at the watershed level, including in pristine areas. Additionally, through the CCA designation, the NPS Program Plan directs its attention to Coastal Areas of Special Biological Significance when addressing management measure implementation.

2. Issue Description:

Nonpoint source discharges include those associated with agricultural activities, livestock and grazing, forestry, marinas, and hydro-modification. Urban/residential, road, and construction storm water runoff discharges not covered under a SWRCB or RWQCB NPDES Storm Water Permit are also nonpoint source discharges.

Nonpoint sources into or immediately adjacent to SWQPAs are from a variety of activities, including surface mining (quarrying), agriculture, grazing, parking lots and roads, boat yards, boat moorings and marinas, runoff from leach fields, potentially faulty septic systems and other activities. Also included as a nonpoint source of pollution is urban/residential storm water not subject to regulation under an MS4 NPDES Permit. Many of these small residential discharges flow through small storm water conveyances, from individual dwellings, and from clusters of dwellings or structures (and associated landscaped areas) into SWQPAs.

The water quality impacts from these nonpoint sources vary by category. Urban, residential, and landscaped area runoff is often toxic and may include sediments, nutrients, oxygen demanding substances, heavy metals, petroleum hydrocarbons, pesticides, and pathogenic viruses and bacteria. Agricultural NPS pollutants of concern include nutrients, sediment, animal wastes, and pesticides. Mining and quarrying activities may contribute excessive sediments, acids and metallic compounds. Pollutants of concern from marinas include pathogenic organisms, nutrients and oxygen demanding substances, biofouling inhibitors (paints and paint additives), nutrients and oxygen demanding substances, and petroleum hydrocarbons; in addition, habitat modification is often associated with marinas and boat moorings.

3. Staff Recommendation:

Amend the 2001 California Ocean Plan to define "controlled to the extent practicable" for nonpoint source discharges, including storm water discharges not subject to regulation under an NPDES permit. This would also amend the implementation provisions for ASBS/SWQPAs in Chapter III (E) of the 2001 California Ocean Plan. "Controlled to the extent practicable" would be defined to prohibit all nonpoint source discharges that are non-essential for emergency fire fighting, flood control and slope stability. Discharges that are considered essential for flood control and slope stability would be controlled under WDRs or conditional waivers issued by a RWQCB. Certain other existing nonpoint source discharges that do not qualify as essential for emergency fire fighting, flood control, and slope stability, but result in no alterations in natural water quality of the SWQPAs may be eligible for WDRs and an exception from the SWRCB. Those nonpoint sources that do result in alterations in natural water quality would need to be eliminated.

All discharges that are considered essential for flood control or slope stability must be issued Waste Discharge Requirements or be covered by conditional waivers issued by a RWQCB. The following surface discharges would be considered essential, and therefore allowable, under the condition that such discharges do not alter natural water quality: 1) foundation and footing drains; 2) water from crawl space pumps; and, 3) roof, landscape, road, and parking lot drainage, during wet weather only and composed entirely of storm water runoff, and designed and maintained to prevent soil erosion. All other nonpoint source discharges would be prohibited.

There are certain existing nonpoint source discharges that do not qualify as essential for fire fighting, flood control, or slope stability. Some of these nonpoint discharges may be issued CDOs and ultimately eliminated. Other nonpoint sources may be eligible for an exception issued by the SWRCB and WDRs issued by the RWQCBs. An example would be existing discharges from commercial boat moorings operations. Exceptions would be considered on a case-by-case

basis as long as no alteration of natural water quality occurs, and monitoring is adequate to assure protection of the SWQPAs.

The proposal allows for both the control of significant nonpoint pollution sources and the continuation of essential runoff, with minimal or no pollutant loads, associated with flood control, slope stability or fire fighting. This would be accomplished with a reasonable administrative burden focussed only on the larger and more significant nonpoint sources. These existing larger and more significant sources are relatively few in number and would either be issued CDOs or be allowed through the exception and WDR process. The more numerous individual properties associated with essential runoff as described above would not result in the RWQCBs expending undue staff resources. Such resources would be instead allocated to handle the few larger nonpoint sources into SWQPAs. Finally, small property owners with essential discharges, and who do not alter natural water quality in a SWQPA, would be shielded from excessive regulation. Staff believes this efficient approach truly may be defined as "to the extent practicable."

V. Proposed California Ocean Plan Amendment

Presented below are the proposed changes to the 2001 California Ocean Plan that will result if *only* the changes proposed in Issue 3 are approved.

1. Table of Contents, Appendices, List of Tables, pages i and ii, replace the references to "Areas of Special Biological Significance" with the term "State Water Quality Protection Areas."

E. Implementation Provisions for ~~Areas of Special Biological Significance~~ State Water Quality Protection Areas

Appendix V: ~~Areas of Special Biological Significance~~ State Water Quality Protection Areas

Table V-1

2. Chapter I, A. Beneficial Uses, page 3 replace the reference to "Areas of Special Biological Significance (ASBS)" with the term "State Water Quality Protection Areas (SWQPAs)."

A. The beneficial uses of the ocean* waters of the State that shall be protected include industrial water supply; water contact and non-contact recreation, including aesthetic enjoyment; navigation; commercial and sport fishing; mariculture*; preservation and enhancement of designated ~~Areas* of Special Biological Significance (ASBS)~~ State* Water Quality Protection Areas (SWQPAs); rare and endangered species; marine habitat; fish migration; fish spawning and shellfish* harvesting.

3. Chapter III, A, 3. Areas of Special Biological Significance, page 11, replace the references to "Areas of Special Biological Significance" and "ASBS" with the terms "State Water Quality Protection Areas" and "SWQPAs."

3. ~~Areas of Special Biological Significance~~ State Water Quality Protection Areas

   a. ~~ASBS*~~ SWQPAs* shall be designated by the SWRCB following the procedures provided in Appendix IV. A list of ~~ASBS*~~ SWQPAs* is available in Appendix V

4. Chapter III, E. Implementation Provisions for Areas of Special Biological Significance (ASBS), page 19, replace the references to "Areas of Special Biological Significance" and "ASBS" with the terms "State Water Quality Protection Areas" and "SWQPAs", replace subsection 1 and add subsections 3 and 4.

E. Implementation Provisions for ~~Areas* of Special Biological Significance (ASBS)~~ State* Water Quality Protection Areas (SWQPAs)

~~1) Waste* shall not be discharged to areas designated as being of special biological significance. Discharges shall be located a sufficient distance from such designated areas to assure maintenance of natural water quality conditions in these areas.~~

1) Point source waste discharges, excluding permitted storm water discharges authorized under subsection (3)(a) below, to SWQPAs are prohibited, except as authorized under subsection (3) (b) below. Discharges authorized by an NPDES storm water permit are allowed only as authorized under subsection (3) (a) below. Nonpoint source discharges, including storm water discharges not subject to regulation under an NPDES permit are allowed only as authorized under subsection (4) below. Discharges shall be located a sufficient distance from such designated areas to assure maintenance of natural water quality conditions in these areas.

2) ~~Regional Boards~~ RWQCBs may approve waste discharge requirements or recommend certification for limited-term (*i.e.* weeks or months) activities in ~~ASBS*~~ SWQPAs*. Limited-term activities include, but are not limited to, activities such as maintenance/repair of existing boat facilities, restoration of sea walls, repair of existing storm water pipes, and replacement/repair of existing bridges. Limited-term activities may result in temporary and short-term changes in existing water quality. Water quality degradation shall be limited to the shortest possible time. The activities must not permanently degrade water quality or result in water quality lower than that necessary to protect existing uses, and all practical means of minimizing such degradation shall be implemented.

3) Special conditions under which discharges authorized under an NPDES permit are allowed into SWQPAs* are as follows:

   a) Existing storm water discharges authorized under an NPDES storm water permit issued by the SWRCB or RWQCBs, only if such discharges are in compliance with the monitoring requirements in Chapter III.G.1 and Appendix III, and with all the requirements for storm water discharges in Appendix VI.

b) Point source discharges authorized under and in compliance with a NPDES permit issued by the SWRCB or RWQCBs, and that are covered by an exception granted by the SWRCB to the SWQPA discharge prohibition. These wastewater discharges must be in compliance with all of the other requirements in this Plan, including but not limited to the monitoring requirements in III G.1 and Appendix III.

4) Nonpoint source discharges, including storm water discharges not subject to regulation under an NPDES permit, are authorized, provided that they are controlled* to the extent practicable as follows:

a) Such discharges must be essential for emergency fire fighting operations, or

b) Such discharges must be essential for flood control or slope stability. The following surface discharges are considered essential, and therefore allowable:

i) Foundation and footing drains

ii) Water from crawl space pumps

iii) Roof, landscape, road and parking lot drainage, during wet weather only and composed entirely of only storm water runoff, designed in such a way so as to prevent soil erosion.

c) Discharges essential for flood control or slope stability must be regulated under Waste Discharge Requirements or covered under conditional waivers issued by a Regional Board; and,

d) Discharges essential for flood control or slope stability must not cause or contribute to a violation of the Water Quality Objectives in Chapter II and must not alter natural water quality in a SWQPA*.

5. Chapter III, H, 2, a. Discharge Prohibitions, page 21, replace the reference to "Areas of Special Biological Significance" with the term "State Water Quality Protection Areas"

H. Discharge Prohibitions

2. Areas Designated for Special Water Quality Protection

a. Waste* shall not be discharged to designated ~~Areas* of Special Biological Significance~~ State* Water Quality Protection Areas except as provided in Chapter III E. Implementation Provisions for ~~Areas of Special Biological Significance~~ State Water Quality Protection Areas.

6. Appendix I, Definition of Terms, pages 23 through 26, delete the definition for "Areas of Special Biological Significance" and add definitions for the terms "State Water Quality Protection Areas", "controlled to the extent practicable", "existing storm water discharges",

"new storm water discharges", "nonpoint source", "nonpoint source pollution", "non-storm water discharge", and "point source".

~~AREAS OF SPECIAL BIOLOGICAL SIGNIFICANCE (ASBS) are those areas designated by the SWRCB as requiring protection of species or biological communities to the extent that alteration of natural water quality is undesirable.~~

CONTROLLED TO THE EXTENT PRACTICABLE, as it relates to nonpoint source pollution including storm water discharges not subject to regulation under an NPDES permit, means a prohibition on all discharges except those that are:

a) Essential for emergency fire fighting operations, or

b) Essential for flood control or slope stability. The following surface discharges are considered essential, and therefore allowable:

i) Foundation and footing drains;

ii) Water from crawl space pumps; and,

iii) Roof, landscape, road and parking lot drainage, during wet weather only and composed entirely of only storm water runoff, designed in such a way so as to prevent soil erosion.

c) Discharges essential for flood control or slope stability must be regulated under Waste Discharge Requirements or covered under conditional waivers issued by a RWQCB; and,

d) Discharges essential for flood control or slope stability must not cause or contribute to a violation of the Water Quality Objectives in Chapter II and must not alter natural water quality in a SWQPA*.

EXISTING STORM WATER DISCHARGE, relative to SWQPAs*, includes any storm water discharge subject to a storm water NPDES permit issued by the SWRCB or RWQCBs, and which drains through an outfall that was constructed prior to the effective date of this policy.

NEW STORMWATER DISCHARGE, relative to SWQPAs*, is any discharge not considered an existing storm water discharge.

NONPOINT SOURCE is any source of pollutants that is not a point source. The term includes, but is not limited to, storm water discharges not subject to regulation under an NPDES permit, and other land runoff, drainage, or seepage.

NONPOINT SOURCE POLLUTION is any water pollution that is caused by nonpoint sources of pollutants.

NON-STORM WATER DISCHARGE means any discharge to a storm drain that is not composed entirely of storm water.

POINT SOURCE is any discernable, confined and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, or concentrated animal feeding operation from which pollutants are or may be discharged. This term does not include agricultural storm water discharges and return flows from irrigated agriculture.

STATE WATER QUALITY PROTECTION AREAS (SWQPAs) are those areas designated to protect marine species or biological communities from an undesirable alteration in natural water quality. All Areas of Special Biological Significance (ASBS) that have been previously designated by the SWRCB in Resolutions 74-28, 74-32, and 75-61 are now to be considered synonymous with State Water Quality Protection Areas.

7. Appendix III, Standard Monitoring Procedures, pages 32 through 35, add monitoring requirements for discharges into SWQPAs.

Ocean Plan Chapter III. E. Implementation Provisions for State* Water Quality Protection Areas (SWQPAs)

Monitoring Requirements for Permittees discharging into SWQPAs*

A. For storm water dischargers authorized under an NPDES storm water permit, the following are required:

1) Effluent monitoring, including:

a) flow measurements;

b) visual observations for trash at the point of discharge into the SWQPA; and,

c) any other effluent monitoring otherwise required in a permit issued by the SWRCB or RWQCB.

2) Receiving water monitoring, including:

a) indicator bacteria analysis as required above in this Appendix III for water contact recreation;

b) chronic toxicity (TUc) shall be measured using critical life stage toxicity tests on a minimum of three test species (a marine fish, invertebrate and plant) according to methods specified above in this Appendix III;

c) monitoring of bioaccumulative toxicants in the discharge zone, as determined by the chemical analysis of mussel tissue (*e.g.*, mussel watch) or sand crab tissue;

d) an intertidal and/or subtidal benthic community analysis; and,

e) any other receiving water monitoring otherwise required in a permit issued by the SWRCB or RWQCB.

3) For receiving water monitoring for chronic toxicity, sampling shall take place within the surf zone at the point where the discharge meets the surface waters of the ocean. Sample sites must be representative of pollution control measures and land uses within the watershed, as determined by the RWQCB. Sampling shall take place, at a minimum, during the first storm event and during at least one additional storm event during each storm season. Upon implementing sufficient control measures to reduce pollution in storm water runoff, so that the water quality objectives are met for at least two consecutive years, the RWQCB may reduce the frequency of chronic toxicity monitoring.

4) For all other effluent and receiving water monitoring, the discharger shall implement a monitoring plan, upon approval by the RWQCB that specifies the sampling frequency, sample locations, and other monitoring details. In making this determination the RWQCB should consider the size and characteristics of the watershed contributing to the discharges.

5) With the exception of self-monitoring for receiving water chronic toxicity, the RWQCB, in lieu of requiring the discharger to perform receiving water self-monitoring, may allow the discharger to participate in an appropriate regional monitoring program. The regional program must include the applicable receiving waters and microbiological, tissue chemistry, and ecological components. In this event the discharger must still be required to self-monitor the effluent, and receiving water chronic toxicity.

B. For point source discharges that are not storm water-related with exceptions from the SWQPA discharge prohibition:

1) Effluent monitoring is required as follows:

a) flow measurements;

b) Table B constituents; and,

c) any other effluent monitoring otherwise required in a permit issued by the SWRCB or RWQCB.

2) Receiving water monitoring is required as follows:

a) indicator bacteria analysis (if determined to be applicable by the RWQCB) as required above in this Appendix III for water contact recreation;

b) monitoring of bioaccumulative toxicants in the discharge zone, as determined by the chemical analysis of mussel tissue (*e.g.*, mussel watch) or sand crab tissue;

c) an intertidal and/or subtidal benthic community analysis; and,

d) any other receiving water monitoring otherwise required in a permit issued by the State or Regional Board.

3) For effluent and receiving water monitoring, the RWQCB shall determine sample number, frequency, locations, and other monitoring details.

4) The RWQCB may, in lieu of issuing a receiving water self-monitoring program to a discharger, allow the discharger to participate in an appropriate regional monitoring program that includes the applicable receiving waters and microbiological (if applicable), tissue chemistry and ecological components. In this event the discharger will still be required to conduct effluent self-monitoring.

8. Appendix IV, Procedures for the Nomination and Designation of Areas of Special Biological Significance, pages 36 and 37, replace references to "Areas of Special Biological Significance" and "ASBS" with the terms "State Water Quality Protection Areas" and "SWQPAs".

APPENDIX IV
PROCEDURES FOR THE NOMINATION AND DESIGNATION OF ~~AREAS* OF SPECIAL BIOLOGICAL SIGNIFICANCE (ASBS)~~ STATE* WATER QUALITY PROTECTION AREAS (SWQPAs).

1. Any person may nominate areas of ocean waters for designation as ~~ASBS~~ SWQPAs by the SWRCB. Nominations shall be made to the appropriate RWQCB and shall include:

   (a) Information such as maps, reports, data, statements, and photographs to show that:

      (1) Candidate areas are located in ocean waters as defined in the "Ocean Plan".

      (2) Candidate areas are intrinsically valuable or have recognized value to man for scientific study, commercial use, recreational use, or esthetic reasons.

      (3) Candidate areas need protection beyond that offered by waste discharge restrictions or other administrative and statutory mechanisms.

   (b) Data and information to indicate whether the proposed designation may have a significant effect on the environment.

      (1) If the data or information indicate that the proposed designation will have a significant effect on the environment, the nominee must submit sufficient information and data to identify feasible changes in the designation that will mitigate or avoid the significant environmental effects.

2. The SWRCB or a RWQCB may also nominate areas for designation as ~~ASBS~~ SWQPAs on their own motion.

3. A RWQCB may decide to (a) consider individual ~~ASBS~~ SWQPA nominations upon receipt, (b) consider several nominations in a consolidated proceeding, or (c) consider nominations in the triennial review of its water quality control plan (basin plan). A nomination that meets the requirements of 1. above may be considered at any time but not later than the next scheduled triennial review of the appropriate basin plan or Ocean Plan.

4. After determining that a nomination meets the requirements of paragraph 1. above, the Executive Officer of the affected RWQCB shall prepare a Draft Nomination Report containing the following:

   (a) The area or areas nominated for designation as ~~ASBS~~ SWQPAs.

   (b) A description of each area including a map delineating the boundaries of each proposed area.

   (c) A recommendation for action on the nomination(s) and the rationale for the recommendation. If the Draft Nomination Report recommends approval of the proposed designation, the Draft Nomination Report shall comply with the CEQA documentation requirements for a water quality control plan amendment in Section 3777, Title 23, California Code of Regulations.

5. The Executive Officer shall, at a minimum, seek informal comment on the Draft Nomination Report from the SWRCB, Department of Fish and Game, other interested state and federal agencies, conservation groups, affected waste dischargers, and other interested parties. Upon incorporation of responses from the consulted agencies, the Draft Nomination Report shall become the Final Nomination Report.

6. (a) If the Final Nomination Report recommends approval of the proposed designation, the Executive Officer shall ensure that processing of the nomination complies with the CEQA consultation requirements in Section 3778, Title 23, California Code of Regulations and proceed to step 7 below.

   (b) If the Final Nomination Report recommends against approval of the proposed designation, the Executive Officer shall notify interested parties of the decision. No further action need be taken. The nominating party may seek reconsideration of the decision by the RWQCB itself.

7. The RWQCB shall conduct a public hearing to receive testimony on the proposed designation. Notice of the hearing shall be published three times in a newspaper of general circulation in the vicinity of the proposed area or areas and shall be distributed to all known interested parties 45 days in advance of the hearing. The notice shall describe the location,

boundaries, and extent of the area or areas under consideration, as well as proposed restrictions on waste discharges within the area.

8. The RWQCB shall respond to comments as required in Section 3779, Title 23, California Code of Regulations, and 40 C.F.R. Part 25 (July 1, 1999).

9. The RWQCB shall consider the nomination after completing the required public review processes required by CEQA.

   (a) If the RWQCB supports the recommendation for designation, the board shall forward to the SWRCB its recommendation for approving designation of the proposed area or areas and the supporting rationale. The RWQCB submittal shall include a copy of the staff report, hearing transcript, comments, and responses to comments.

   (b) If the RWQCB does not support the recommendation for designation, the Executive Officer shall notify interested parties of the decision, and no further action need be taken.

10. After considering the RWQCB recommendation and hearing record, the SWRCB may approve or deny the recommendation, refer the matter to the RWQCB for appropriate action, or conduct further hearing itself. If the SWRCB acts to approve a recommended designation, the SWRCB shall amend Appendix V, Table V-1, of this Plan. The amendment will go into effect after approval by the Office of Administrative Law and US EPA. In addition, after the effective date of a designation, the affected RWQCB shall revise its water quality control plan in the next triennial review to include the designation.

11. The SWRCB Executive Director shall advise other agencies to whom the list of designated areas is to be provided that the basis for an ~~ASBS~~ SWQPAs designation is limited to protection of marine life from waste discharges.

9. Appendix V, Areas* of Special Biological Significance, pages 38 and 39, replace references to "Areas of Special Biological Significance" with the term "State Water Quality Protection Areas." Rename the ASBS/SWQPAs, consistent with the re-classification of the other marine managed areas, per PRC Section 36600 *et seq*. Correct the reference to ASBS/SWQPA 17, San Miguel, Santa Rosa, and Santa Cruz Islands, to show that it is located in RWQCB 3. Correct the reference to ASBS 33 to show that it is located in both RWQCBs 8 and 9.

APPENDIX V

~~AREAS* OF SPECIAL BIOLOGICAL SIGNIFICANCE~~ STATE* WTAER QUALITY PROTECTION AREAS

TABLE V-1

~~AREAS OF SPECIAL BIOLOGICAL SIGNIFICANCE~~ STATE WTAER QUALITY PROTECTION AREAS
(DESIGNATED OR APPROVED BY THE STATE WATER RESOURCES CONTROL BOARD)

No.	~~ASBS~~ SWQPA Name	Date Designated	SWRCB Resolution No.	Region No.
1.	~~Pygmy Forest Ecological Staircase~~ Jughandle Cove	March 21, 1974,	74-28	1
2.	Del Mar Landing ~~Ecological Reserve~~	March 21, 1974,	74-28	1
3.	Gerstle Cove	March 21, 1974,	74-28	1
4.	Bodega ~~Marine Life Refuge~~	March 21, 1974,	74-28	1
5.	~~Kelp Beds at~~ Saunders Reef	March 21, 1974,	74-28	1
6.	~~Kelp Beds at~~ Trinidad Head	March 21, 1974,	74-28	1
7.	Kings Range ~~National Conservation Area~~	March 21, 1974,	74-28	1
8.	Redwood National Park	March 21, 1974,	74-28	1
9.	James V. Fitzgerald ~~Marine Reserve~~	March 21, 1974,	74-28	2
10.	Farallon Islands	March 21, 1974,	74-28	2
11.	Duxbury Reef ~~Reserve and Extension~~	March 21, 1974,	74-28	2
12.	Point Reyes Headland ~~Reserve and Extension~~	March 21, 1974,	74-28	2
13.	Double Point	March 21, 1974,	74-28	2
14.	Bird Rock	March 21, 1974,	74-28	2
15.	Año Nuevo ~~Point and Island~~	March 21, 1974,	74-28	3
16.	Point Lobos ~~Ecological Reserve~~	March 21, 1974,	74-28	3
17.	San Miguel, Santa Rosa, and Santa Cruz Islands	March 21, 1974,	74-28	4 3
18.	Julia Pfeiffer Burns ~~Underwater Park~~	March 21, 1974,	74-28	3
19.	Pacific Grove ~~Marine Gardens Fish Refuge and Hopkins Marine Life Refuge~~	March 21, 1974,	74-28	3
20.	~~Ocean Area Surrounding the Mouth of~~ Salmon Creek Coast	March 21, 1974,	74-28	3
21.	San Nicolas Island and Begg Rock	March 21, 1974,	74-28	4
22.	Santa Barbara~~, Santa Barbara County~~ and Anacapa Island	March 21, 1974,	74-28	4
23.	San Clemente Island	March 21, 1974,	74-28	4
24.	~~Mugu Lagoon~~ Laguna Point to Latigo Point	March 21, 1974,	74-28	4
25.	Northwest Santa Catalina Island ~~– Subarea One, Isthmus Cove to Catalina Head~~	March 21, 1974,	74-28	4
26.	Western Santa Catalina Island ~~– Subarea Two, North End of Little Harbor to Ben Weston~~	March 21, 1974,	74-28	4

	~~Point~~			
27.	~~Santa Catalina Island – Subarea Three,~~ Farnsworth Bank ~~Ecological Reserve~~	March 21, 1974,	74-28	4
28.	Southeast Santa Catalina Island ~~– Subarea Four, Binnacle Rock to Jewfish Point~~	March 21, 1974,	74-28	4
29.	San Diego-La Jolla ~~Ecological Reserve~~	March 21, 1974,	74-28	9
30.	Heisler Park ~~Ecological Reserve~~	March 21, 1974,	74-28	9
31.	San Diego-Scripps ~~Marine Life Refuge~~	March 21, 1974,	74-28	9
32.	Newport Beach ~~Marine Life Refuge~~	April 18, 1974	74-32	8
33.	Irvine Coast ~~Marine Life Refuge~~	April 18, 1974	74-32	8, 9
34.	Carmel Bay	June 19, 1975	75-61	3

10. Add a new Appendix VI, Storm water Discharge Requirements for State* Water Quality Protection Areas.

APPENDIX VI
REQUIREMENTS FOR DISCHARGES AUTHORIZED UNDER AN NPDES STORM WATER PERMIT INTO SWQPAs*

No new storm water discharges are allowed. Existing storm water dischargers, as of the effective date of this Plan, must be in compliance with the following requirements:

1. Non-storm water discharges*, with the exception of those associated with emergency fire fighting, are prohibited from contacting the surface waters of a SWQPA*. Implementation of this prohibition will be within three years of the effective date of this Plan. Dischargers are required to specifically address the prohibition on non-storm water discharges into SWQPAs* in their Storm Water Management Plans (SWMPs) or Storm Water Pollution Prevention Plans (SWPPPs). The SWMP or SWPPP must describe the measures by which non-storm water discharges would be ultimately prevented from entering a SWQPA, and interim measures that are to be employed to reduce non-storm water flows until the ultimate measures are implemented.

2. Storm waters discharges to a SWQPA* are allowed provided that water quality objectives found in Chapter II ("Water Quality Objectives") of this Plan are met. The dischargers shall comply with their NPDES storm water permits which include SWMPs or SWPPPs. The SWMP or SWPPP describe the Best Management Practices (BMPs) and other actions to reduce pollutants in the discharges. Within six months of the effective date of this Plan the SWMP or SWPPP shall specifically address discharges into SWQPAs* and must include a schedule for implementation, and be subject to the approval of the RWQCB. The schedule must be developed to ensure BMPs are implemented as soon as practicably possible.

   If the results of water quality monitoring indicate discharges are causing or contributing to exceedance(s) of applicable water quality objectives, then:

=

a) The discharger would be required to submit a report to the RWQCB within 30 days. That report must describe BMPs that are currently being implemented, BMPs that are planned for in the SWMP or SWPPP, and additional BMPs that may be added to the SWMP or SWPPP. The report shall include an implementation schedule. The RWQCB may require modifications to the report.

b) The discharger shall submit any modifications to the report required by the RWQCB within 30 days of notification.

c) Within 30 days following approval of the report described above by the RWQCB, the discharger shall revise the SWMP or SWPPP to incorporate the approved modified control measures that have been and will be implemented, implementation schedule, and any additional monitoring required.

d) The discharger shall implement the revised SWMP or SWPPP and monitoring program in accordance with the approved schedule.

So long as the dischargers have complied with the procedures set forth above and are implementing the revised SWMP or SWPPP, the dischargers do not have to repeat the same procedure for continuing or recurring exceedances of the same receiving water quality objectives, unless directed by the RWQCB to develop additional BMPs.

3. Any storm water collection, transport, treatment, storage, and disposal facilities operated by the discharger shall at all times be operated as efficiently as possible and maintained in good working order.

4. Storm waters that are discharged to surface waters of a SWQPA* shall not violate the requirements found in Chapter III.A.2 of this Plan.

5. The discharge of treated or untreated domestic wastewater, industrial waste, garbage, trash, or other solid wastes, or any deleterious material to surface waters is prohibited.

6. The discharge of oil, gasoline, diesel fuel, or any other petroleum derivative or any toxic chemical or hazardous waste is prohibited.

7. All storm water that is discharged to surface waters of a SWQPA* shall not contain substances in concentrations that are toxic to, or that produce detrimental physiological responses to human, plant, or animal life.

8. All storm water shall be controlled so as not to cause downstream erosion.

9. The discharge or threatened discharge, attributable to human activities, of solid or liquid waste materials including soil, silt, clay, sand, and other organic and earthen materials to surface waters, in quantities that alter or threaten to alter the natural water quality or adversely impact the benthic community of the SWQPA*, is prohibited.

10. Discharges shall not threaten or cause pollution or a nuisance, as defined in Section 13050 of the California Water Code.

11. Within one year of the effective date of this Plan, all storm water dischargers must comply with the monitoring requirements in Chapter III.G.1 and the storm water monitoring requirements in Appendix III.

Issue 4: Reasonable Potential: Determining when California Ocean Plan Water Quality-based Effluent Limitations are Needed

I. Summary of Proposed California Ocean Plan Amendment

Remove existing language that allows dischargers to certify that Table B pollutants are not present in their effluent *in lieu* of monitoring, and add new "reasonable potential" language to Chapter III (Program of Implementation) of the California Ocean Plan.

II. Present California Ocean Plan

Dischargers are currently allowed to certify that Table B pollutants are not present in their effluent *in lieu* of monitoring.

III. Issue Description

A. Regulatory Background

1. California Ocean Plan

Table B of the 2001 California Ocean Plan contains numeric water quality objectives for the protection of beneficial uses in receiving waters. These water quality objectives are used to derive effluent limitations in National Pollutant Discharge Elimination System (NPDES) permits.

The California Ocean Plan also contains Implementation Provisions in Chapter III for the management of wastes discharged to the ocean. The following paragraph appears on p. 21of the California Ocean Plan (SWRCB 2001) under the Monitoring Program:

> Where the Regional Board is satisfied that any substance(s) of Table B will not significantly occur in a discharger's effluent, the Regional Board may elect not to require monitoring for such substance(s), provided the discharger submits periodic certification that such substance(s) is not added to the waste stream, and that no change has occurred in activities that could cause such substance(s) to be present in the waste stream. Such election does not relieve the discharger from the requirement to meet the objectives of Table B.

This language first appeared in the 1983 California Ocean Plan (SWRCB 1983a). The Final Environmental Impact Report (EIR) for the 1983 Ocean Plan (Volume 1, Section II, p. 31-32) explained the rationale for the addition (SWRCB 1983b). Comments received in 1983 expressed the view that "there should be a mechanism in the Ocean Plan for reducing or removing limits and monitoring requirements when the discharger either does not discharge a substance or consistently meets Table B requirements." The EIR explains further that "allowing dischargers relief in these instances would reduce unnecessary monitoring costs." This 1983 addition to the California Ocean Plan was expected to reduce monitoring requirements for such dischargers as

marine aquaria or aquaculture operations and was "not expected to apply to municipal dischargers."

The underlying motive for this language, therefore, was to reduce monitoring costs when discharges have a high likelihood of being free of Table B pollutants. The language was not intended to allow the removal of effluent limitations. The original comments were valid in that the California Ocean Plan, then as now, does not contain guidance for determining which Table B pollutants should be translated into numeric effluent limits.

A literal reading of the 2001 California Ocean Plan would lead one to believe that effluent limitations are required for all Table B pollutants. Indeed, many existing ocean discharge permits routinely contain effluent limits for *every* pollutant listed in Table B. For example, p. 12 of the 2001 California Ocean Plan reads as follows (emphasis added):

> Effluent limitations for water quality objectives listed in Table B, with the exception of acute toxicity and radioactivity, **shall** be determined through the use of the following equation:
>
> $$C_e = C_o + D_m (C_o - C_s) \qquad \text{(Equation 1)}$$
>
> where C_e = the effluent concentration limitation in μg/L,
> C_o = the concentration in μg/L to be met at the completion of initial dilution (*i.e.*, the Table B Water Quality Objective),
> C_s = the background seawater concentration in μg/L [from the Ocean Plan Table C],
> D_m = minimum probable initial dilution expressed as parts seawater per part wastewater.

Equation 1 was derived by consideration of mass balance relationships.

The periodic discharger certification effectively replaces actual analytical monitoring. Appendix III of the California Ocean Plan, however, requires periodic monitoring of Table B pollutants, the monitoring frequency being based on the discharger's flow rate.

The net effect of using the 1983 "relaxation of monitoring" language is the possibility of having effluent limitations in ocean discharge permits without adequately monitoring for the regulated pollutant. The California Ocean Plan would be amended by deleting the 1983 language.

2. Federal NPDES Regulation

In contrast, the NPDES Federal Regulations do provide procedures for permitting authorities to determine when water quality-based effluent limitations are needed (40 CFR 122.44 (d)(1)(ii)):

> When determining whether a discharge causes, has the reasonable potential to cause, or contributes to an in-stream excursion above a narrative or numeric criteria within a State water quality standard, the permitting authority shall use procedures which

> account for existing controls on point and nonpoint sources of pollution, the variability of the pollutant or pollutant parameter in the effluent, the sensitivity of the species to toxicity testing (when evaluating whole effluent toxicity), and where appropriate, the dilution of effluent in the receiving water.

Note that water quality *criteria* in federal regulations are analogous to water quality *objectives* in the California Ocean Plan. In addition, 40 CFR 122.44 (d)(1)(iii) reads (emphasis added):

> When the permitting authority determines, using the procedures in paragraph (d)(1)(ii) of this section, that a discharge causes, has the reasonable potential to cause, or contributes to an in-stream excursion above the allowable ambient concentration of a State numeric criteria within a State water quality standard for an individual pollutant, **the permit must contain effluent limits for that pollutant**.

Because effluent limitations are developed for those pollutants having a "reasonable potential" to exceed a water quality criterion, the net effect of a reasonable potential analysis may be a reduction in the number of effluent limitations incorporated into a permit. The NPDES discharger, however, is responsible for attaining, monitoring, and maintaining compliance with those effluent limitations in the NPDES permit. Under Section 308 of the Clean Water Act dischargers are required to sample effluents and make monitoring reports to determine, in part, any violations of effluent limitations.

In summary, Federal NPDES Regulations require that NPDES permits contain effluent limitations for those pollutants that cause, or may cause or contribute to, an exceedance of the State water quality criteria. Accordingly, effluent monitoring is required to ensure compliance with those effluent limitations.

B. Statistical Procedures to Determine the Need for an Effluent Limitation

Various procedures are used to assist NPDES permit writers when deciding whether a water quality-based effluent limitation is needed. Conceptually, this is a yes-or-no dichotomous decision. Statistical methods of data analysis are often employed in order to produce a scientifically defensible decision. All statistical procedures, however, require a representative effluent sample and an examination of the assumptions underlying the statistical model employed. Presented below are procedures that are currently being used, or could be used, to determine the need for an effluent limitation.

1. USEPA's TSD Reasonable Potential Procedure

In 1991, the U.S. Environmental Protection Agency (USEPA) published the *Technical Support Document for Water Quality-based Toxics Control* (USEPA 1991). This document, abbreviated as TSD, contains guidance for characterizing an effluent discharge and for conducting a reasonable potential analysis (TSD, Chapter 3, Effluent Characterization). The USEPA developed this statistical approach to characterize effluent variability and reduce uncertainty when deciding whether to require an effluent limit:

> EPA recommends finding that a permittee has "reasonable potential" to exceed a receiving water quality standard if it cannot be demonstrated with a high confidence level that the upper bound of the lognormal distribution of effluent concentrations is below the receiving water criteria at specified low-flow conditions (TSD Box 3-2, p.53).

The TSD procedure estimates an upper bound of the pollutant distribution by multiplying the maximum observed sample value by a factor determined from the selected confidence level and the selected "probability basis" (*i.e.*, the selected upper percentile of the lognormal distribution). The maximum observed sample value, unfortunately, is the usually the first data point to be suspected of being an outlier, *i.e.*, an extreme observation far removed from the main body of data. The TSD procedure does not require a minimum sample size, but for small data sets ($n \leq 9$) USEPA advises to use a default CV value of 0.6 instead of estimating the CV from the effluent sample.

Two tables of Reasonable Potential Multiplying Factors are given in the TSD: the 99% confidence level with 99% probability basis and the 95% confidence level with 95% probability basis. The guidance allows for other probability basis percentiles to be selected by regulatory agencies, but is silent on other acceptable upper confidence levels.

If the discharger is allowed a mixing zone then the upper bound effluent concentration is adjusted to the upper bound concentration expected at the edge of the mixing zone after complete mixing. Solving the mass balance Equation 1 for C_o produces an estimate of the effluent concentration after mixing. An effluent limitation is required if the upper bound concentration is greater than the water quality objective.

An example of effluent limitations established using the TSD reasonable potential procedure is the current City of San Francisco Westside wastewater treatment plant NPDES permit (City and County of San Francisco 1996).

2. USEPA's Great Lakes Reasonable Potential Procedure

In 1995 the USEPA promulgated the Final Water Quality Guidance for the Great Lakes System (GLS) in the Federal Register (USEPA 1995). This guidance was added to the Code of Federal Regulations at 40 CFR Part 132. The GLS reasonable potential procedure, Procedure 5, is found in Appendix F of the GLS and is very similar to the reasonable potential procedures found in the TSD. The *projected effluent quality* is specified as...

> the 95% confidence level of the 95th percentile based on a lognormal distribution or the maximum observed effluent concentration, whichever is greater.

Alternatively, the permit writer may define the *projected effluent quality* as...

> the 95th percentile of the distribution of the projected population of daily [weekly or monthly] values of the facility-specific effluent monitoring data projected using a scientifically defensible statistical method that accounts for and captures the long-

> term daily [weekly or monthly] variability of the effluent quality, accounts for limitations associated with sparse data sets and, unless otherwise shown by the effluent data set, assumes a lognormal distribution of the facility-specific effluent data.

The GLS also requires the calculation of a *preliminary effluent limitation*, which incorporates the water quality criterion, effluent dilution, and background pollutant concentrations. Mixing zones for bioaccumulative chemicals are not allowed for some GLS dischargers.

A water quality-based effluent limitation is required if the *projected effluent quality* exceeds the *preliminary effluent limitation*.

3. Ohio's Reasonable Potential Procedure

The alternative GLS reasonable potential definition allows Great Lakes States more flexibility when determining the need for effluent limits. For example, the State of Ohio has recommended comparing the *projected effluent quality* with 75% of the *preliminary effluent limitation*. This revised definition results in a reasonable potential procedure that is more protective than the GLS and was thought to provide a necessary buffer against inaccurate reasonable potential determinations (Ohio 1996).

4. Colorado's Reasonable Potential Procedure

The State of Colorado recently issued guidance for determining reasonable potential (Colorado 2003). Colorado's procedure is similar to the USEPA TSD procedure. The 99th percentile of the effluent distribution (calculated with 99% confidence) or the sample maximum, whichever is higher, is compared to the numeric water quality criterion.

At least ten effluent samples collected over a period of one year are required for reasonable potential assessments. Finally, the procedure provides guidance for estimating the effluent variability when some of the observations are below the analytical detection limit or suspected of being statistical outliers.

5. Procedures using a Statistical Confidence Interval for a Distribution Percentile

All of the above procedures are similar in that they use the maximum observed sample value and a Reasonable Potential Multiplying Factor. Standard statistical methods, however, are readily available to estimate the upper percentile of a statistical distribution with a given high level of confidence; statisticians call this a *tolerance interval* and the resulting estimate is called an *upper confidence bound* (Hahn and Meeker 1991; Gibbons and Coleman 2001). Upper confidence bounds can be calculated for data believed to come from a normal distribution, a lognormal distribution, or any distribution (*i.e.*, a distribution-free tolerance interval).

Hahn and Meeker (1991) tabulated normal tolerance factors for the construction of upper confidence bounds when the data are normally distributed. This statistical confidence interval for percentiles accounts for long-term variability; highly variable data produce a larger upper

confidence bound. In addition, this method produces larger confidence bounds when increased uncertainty is present due to small sample sizes (sparse data sets). As the sample size increases the upper confidence bound decreases and ultimately converges on the true population percentile.

The same normal tolerance factors can be applied to lognormal distributions by a logarithmic transformation of the effluent data (Gibbons and Coleman 2001). Ott (1990) demonstrated that lognormal distributions of concentrations of environmental pollutants can arise naturally from certain physical processes, especially after a series of independent random dilutions. Along these lines, USEPA suggests that "a lognormal distribution is generally more appropriate as a default statistical model than the normal distribution" (USEPA 1992, p.2). A minimum sample size of two is required to construct confidence intervals on a percentile of a normal or lognormal distribution.

In situations where no assumption can be made about the effluent distribution, non-parametric methods are available to construct confidence intervals on the upper percentile of any continuous statistical distribution (Hahn and Meeker 1991). These non-parametric estimates of a percentile are based on the larger observed values in the data set and generally require a large number of observations.

In certain regulatory situations, a one-sided, upper confidence bound on an upper percentile is used to compare a set of environmental samples to a fixed regulatory standard (Gibbons and Coleman 2001, Chapter 19*, Corrective Action Monitoring*). When applied to a reasonable potential analysis, the null hypothesis is that the true upper percentile is greater than or equal to the water quality objective. We reject this null hypothesis if sufficient evidence is provided through the discharger's pollutant monitoring program; in other words, we reject the null hypothesis if the one-sided, upper confidence bound on the upper percentile is below the water quality objective. If we cannot reject this null hypothesis then we conclude that the pollutant discharge has the reasonable potential to exceed the water quality objective and an effluent limitation is required.

6. Censored Data Statistical Considerations

Any reasonable potential analysis will be complicated by the presence of monitoring data below the analytical detection limit. Gibbons and Coleman (2001, Chapter 13) presented an extensive review of statistical techniques useful for analyzing environmental data that include results not completely quantified. Such data are *censored* by a limit of detection or by a limit of quantification, or both, usually on the left tail of the population distribution.

Sample results below the limit of detection (*i.e.*, the USEPA Method Detection Limit) are *non-detects*, ND. Monitoring samples at or above the limit of detection but below the limit of quantification (*i.e*., the Ocean Plan Minimum Level) are *detected but not quantified*, DNQ. Various combinations of data types (NDs, DNQs, or quantified) are theoretically possible depending on the effluent distribution, the limit of detection, and the limit of quantification.

Gibbons and Coleman suggest applying Cohen's Maximum Likelihood Estimator, MLE (Cohen 1961) for censored data sets. Cohen's MLE technique adjusts the uncensored sample mean and uncensored sample standard deviation by a factor derived from the proportion of non-detects and the censoring point. Cohen's MLE "appears to work best for small normally distributed samples, and lognormal versions of the estimator can be obtained simply by taking natural logarithms of the data and censoring point." Cohen's MLE is also recommended by the USEPA when 15 - 50% of the samples are censored (USEPA 1992; USEPA 1998). Use of Cohen's MLE requires at least two quantified sample measurements (Gibbons and Coleman 2001, Sec 13.4).

The TSD presented a *delta lognormal* technique to account for effluent data censored by a single detection limit (USEPA 1991, Appendix E). Hinton (1993) concluded, however, that this technique vastly overestimates the mean compared to Cohen's MLE technique, especially when censoring is >60%.

Recent water quality data simulations by Shumway *et al*. (2002) indicate that the *Regression on Order Statistics* technique (ROS) of Helsel and Gilliom (1986) is robust, unbiased, and has a smaller variance than the MLE technique under the lognormal distribution.

Unfortunately, the majority of censored data statistical techniques assume that only one detection limit or censoring level is present in the data; however, effluent data often contain several analytical detection limit thresholds within the same data set. A refinement of the ROS technique is available for water quality data having multiple detection limits or censoring levels (Helsel and Cohn 1988).

7. Comparison of Reasonable Potential Procedures

SWRCB staff developed a set of criteria for comparing reasonable potential procedures by adopting essential elements from the NPDES Federal Regulations and desirable elements from other state reasonable potential procedures. Table 4-1 compares the TSD procedure with the tolerance bound procedure in relation to these desirable criteria.

Appendix 4-1 further illustrates the reasonable potential conclusions that would be made under the two procedures using actual effluent data from a major ocean discharger. In this example, the upper confidence bounds calculated using the tolerance bound procedure produce a more realistic estimate of the upper population percentile as compared to the TSD procedure, especially with smaller sample sizes.

C. Determining the Need for an Effluent Limitation with Insufficient Monitoring Data

A scientifically defensible, statistically based, reasonable potential procedure allows an objective characterization of effluent discharges and is to be preferred. A statistical analysis of actual facility-specific monitoring data will lead to a more objective reasonable potential decision. In most cases, a minimum of two quantified samples above the limit of quantification are required to use these statistical methods.

If facility-specific monitoring data are insufficient to use the statistical procedures then permit writers must use professional judgments similar to situations where effluent monitoring data are lacking, that is, a non-statistically-based reasonable potential decision. These situations include facilities having no effluent data or a single effluent sample or a highly censored effluent data set having less than two quantified samples, thereby precluding the use of censored data statistical techniques.

In the absence of facility-specific monitoring data or if insufficient facility-specific monitoring data exist to use statistical procedures, the permit writer must provide adequate justification for any effluent limits included in the permit. The TSD lists several factors to consider in addition to effluent monitoring data when determining whether a discharge causes, has the reasonable potential to cause, or contributes to an excursion of a State water quality criterion. These factors include facility dilution, type of industry or POTW, other existing data (including the NPDES application), history of compliance, and type of receiving water.

If the permit writer is unable to decide whether the discharge would exceed the water quality criterion the TSD recommends that whole effluent toxicity testing or additional chemical-specific testing be added as a permit condition. This includes 100% censored data sets when all limits of detection are greater than the water quality criterion.

IV. Staff Recommendations

Because a tolerance bound procedure more appropriately utilizes facility-specific effluent data, SWRCB staff recommend the use of a lognormal tolerance interval-based procedure, as outlined in this section, for reasonable potential determinations rather than the TSD-based procedures. The water quality objective should be compared to the one sided, upper 95% confidence bound of the 95^{th} percentile of a lognormal distribution. A lognormal distribution is appropriate as a default statistical model when conducting a reasonable potential analysis. Furthermore, when dilution is allowed, the one-sided upper confidence bound on the upper percentile should be adjusted by the mass balance equation (Equation 1 solved for C_o) prior to comparison with the water quality objective.

SWRCB staff recommend the Helsel and Cohn (1988) method as a general approach for accounting for censored data when assessing reasonable potential. This technique is also recommended in the Colorado Reasonable Potential Procedure (2003).

Eventually, data censoring may so severe that a statistically based decision of reasonable potential cannot be made. This may happen when the water quality objective is far below the limit of quantification or when the sample size is small. Under these conditions, the permit writer must use guidance for determining the need for an effluent limit using insufficient monitoring data (see Determining the Need for an Effluent Limitation with Insufficient Monitoring Data above).

Using the criteria in Table 4-1, SWRCB staff composed the reasonable potential language in the proposed amendment. The first paragraph of the proposed amendment states the general reasonable potential test to determine if an effluent limitation is needed. The second and third paragraph of the proposed amendment summarize factors to consider when assessing the need for an effluent

limitation using a statistically-based approach. The general intent is to produce a scientifically defensible estimate of the 95th percentile of the true effluent distribution while accounting for uncertainty produced by small sample sizes and censored data values.

The last paragraph of the proposed amendment summarizes factors to consider when assessing the need for an effluent limitation if insufficient information precludes the use of a statistically-based approach.

Staff of the Ocean Standards Unit are simultaneously developing a computer software program (RPCalc) that will perform the statistically based reasonable potential calculations recommended and presented in this section (Saiz 2003). This reasonable potential "calculator" can be use as a tool by permit writers to easily compare an effluent data set with the Ocean Plan Table B water quality objective using the procedures identified in the proposed amendment.

V. Proposed California Ocean Plan Amendment

Presented below are the proposed changes to the 2001 California Ocean Plan that will result if *only* the changes proposed in Issue 4 are approved.

1. Chapter III, G. Monitoring Program, 2, page 21, delete subsection 2 and renumber subsection 3.

G. Monitoring Program

~~2. Where the Regional Board is satisfied that any substance(s) of Table B will not significantly occur in a discharger's effluent, the Regional Board may elect not to require monitoring for such substance(s), provided the discharger submits periodic certification that such substance(s) is not added to the waste* stream, and that no change has occurred in activities that could cause such substance(s) to be present in the waste* stream. Such election does not relieve the discharger from the requirement to meet the objectives of Table B.~~

~~3~~2. The ~~Regional Board~~ RWQCB may require monitoring of bioaccumulation of toxicants in the discharge zone. Organisms and techniques for such monitoring shall be chosen by the ~~Regional Board~~ RWQCB on the basis of demonstrated value in waste* discharge monitoring.

2. Chapter III, C. Implementation Provisions for Table B, page 12, add new subsection 2 on reasonable potential and renumber subsequent subsections.

C. Implementation Provisions for Table B

2. If the RWQCB determines that a pollutant is discharged into Ocean Waters at levels which will cause, have the reasonable potential to cause, or contribute to an excursion above any Table B water quality objective, the RWQCB shall incorporate a water

quality-based effluent limitation in the Waste Discharge Requirement for the discharge of that pollutant.

An effluent discharge has the reasonable potential to exceed a Table B water quality objective if it cannot be demonstrated that the one-sided, upper 95% confidence bound on the 95th percentile of the pollutant discharge distribution is below the Table B water quality objective after accounting for dilution and background seawater concentrations.

In determining the need for an effluent limitation, the RWQCB shall use all representative information to characterize the pollutant discharge using a scientifically defensible statistical method that:

a. accounts for and captures the long-term variability of the pollutant in the effluent;

b. accounts for limitations associated with sparse data sets;

c. accounts for uncertainty associated with censored data sets; and,

d. unless otherwise shown by the effluent data set, assumes a lognormal distribution of the facility-specific effluent data.

If insufficient information precludes the use of a statistical method to characterize the pollutant discharge or if the pollutant data consist entirely of results below the MDL or ML (or a combination of both), then the RWQCB shall require whole effluent chronic toxicity testing or additional pollutant-specific monitoring as a condition of the Waste Discharge Requirement.

~~2~~3. Effluent limitations shall be imposed in a manner prescribed by the SWRCB such that the concentrations set forth below as water quality objectives shall not be exceeded in the receiving water upon completion of initial* dilution, except that objectives indicated for radioactivity shall apply directly to the undiluted waste* effluent.

~~3~~4. Calculation of Effluent Limitations

4~~5~~. Minimum* Levels

~~5~~6. Use of Minimum* Levels

~~6~~7. Sample Reporting Protocols

~~7~~8. Compliance Determination

~~8~~9. Pollutant Minimization Program

~~9~~10. Toxicity Reduction Requirements

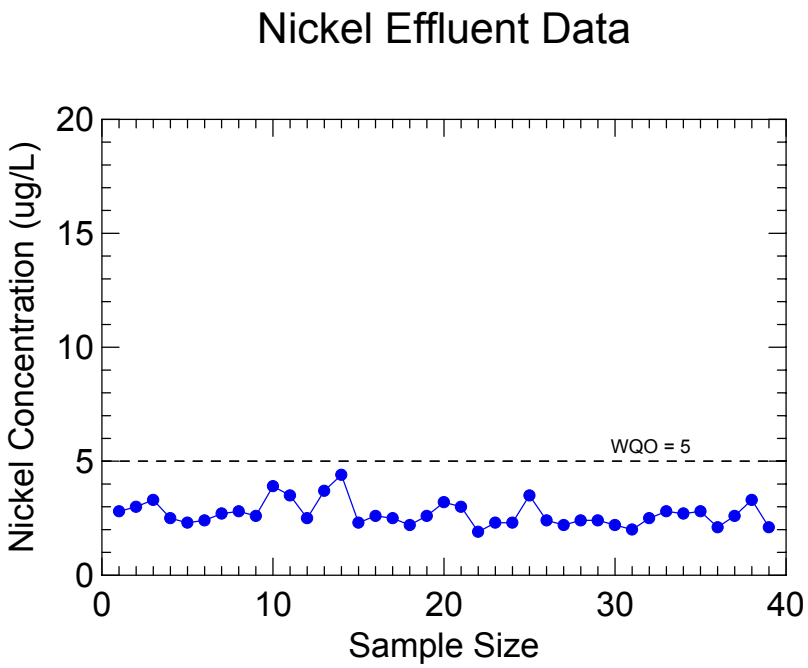
Table 4-1. Comparison of reasonable potential procedures in relation to desirable criteria.

Desirable Criterion	TSD Procedure	Lognormal Tolerance Bound Procedure
Incorporates a scientifically defensible statistical method.	True. An upper percentile estimated with high confidence is compared to the Water Quality Objective	True. The 95th percentile estimated with 95% confidence is compared to the Water Quality Objective.
Accounts for and captures the long-term variability of the pollutant in the effluent.	True for 10 or more samples. False for less than 10 samples.	True. Effluent variability is estimated from the samples for all sample sizes.
Accounts for limitations associated with censored data sets.	True. Delta lognormal technique assumes one censoring threshold.	True. The Helsel and Cohn (1988) technique accounts for multiple censoring thresholds and performs better than the Delta lognormal technique.
Accounts for limitations associated with sparse data sets.	True. Small data sets produce a larger upper confidence bound. Large data sets converge on the true population percentile.	True. Small data sets produce a larger upper confidence bound. Large data sets converge on the true population percentile faster than the TSD procedure.
Incorporates dilution of the effluent in the receiving water.	True.	True.
Is not unduly affected by outliers or extreme data values.	False. Sample maximum will be a prime outlier suspect.	True. Sample mean and standard deviation are derived from all data and are not unduly influenced by a single observation.
Assumes effluent data is lognormally distributed, unless otherwise shown by the data	True.	True.

Appendix 4-1. Comparison of the TSD procedure and the Lognormal Tolerance Bound procedure using nickel effluent data from an ocean discharger.

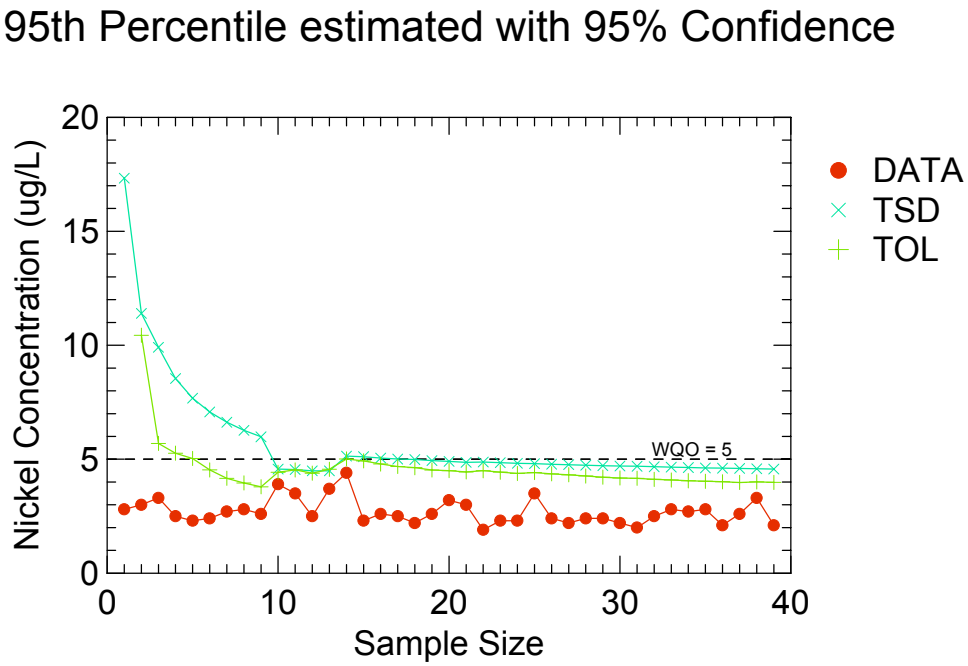
The California Ocean Plan water quality objective for nickel is 5 µg/L. Total nickel was measured each month in the effluent of a major California ocean discharger over a three year-period, from January 1999 to June 2002. The data set in µg/L in chronological order is {2.8, 3.0, 3.3, 2.5, 2.3, 2.4, 2.7, 2.8, 2.6, 3.9, 3.5, 2.5, 3.7, 4.4, 2.3, 2.6, 2.5, 2.2, 2.6, 3.2, 3.0, 1.9, 2.3, 2.3, 3.5, 2.4, 2.2, 2.4, 2.4, 2.2, 2.0, 2.5, 2.8, 2.7, 2.8, 2.1, 2.6, 3.3, 2.1}.

For this data, the mean nickel value was 2.7 µg/L, the median value was 2.6, and the sample CV was 0.2. All samples were above the detection limit and no single sample exceeded the water quality objective as illustrated below:


Nickel Effluent Data
Nickel Concentration (ug/L)
Sample Size
WQO = 5
0
5
10
15
20
0
10
20
30
40

Using all 39 available samples, we may estimate the one-sided, upper 95% confidence bound on the 95th percentile prior to dilution. The upper confidence bound using the TSD procedure is 4.6 µg/L, whereas using the Tolerance Bound procedure gives 4.0 µg/L. The upper bound of both procedures is less than the water quality objective; both procedures would conclude that an effluent limitation is not required based on 39 samples.

What if fewer samples were available? We can successively reduce the sample size by one observation, then recalculate the upper confidence bounds. The following figure illustrates the upper confidence bounds for the two procedures in relation to sample size:


95th Percentile estimated with 95% Confidence
Nickel Concentration (ug/L)
Sample Size
WQO = 5
DATA
TSD
TOL
0
5
10
15
20
0
10
20
30
40

Examination of the above figure reveals that the upper confidence bound increases using either procedure as the sample size decreases. This is due to the uncertainty associated with smaller sample sizes. The Tolerance Bound procedure would require an effluent limitation for 5 or less samples. The TSD procedure would require an effluent limitation for data sets of 9 or less samples and this conclusion would be based on a default CV of 0.6 rather than on the actual sample variability. The TSD procedure would also require an effluent limitation for sample sizes of 14, 15, 16 or 17. Note that in this example, upper confidence bounds calculated using tolerance intervals are always lower than bounds calculated with the TSD procedure.

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