State Water Resources Control Board

Winston H. Hickox
Secretary for Environmental Protection

Division of Water Quality
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Gray Davis
Governor

July 12, 2002

Members and Alternates:

MEETING OF THE AB 982 PUBLIC ADVISORY GROUP

The AB 982 Public Advisory Group (PAG) will meet on July 23, 2002 in the Coastal Hearing Room (2nd floor), in the Cal/EPA Building located at 1001 I Street in Sacramento, California.

Please find enclosed the meeting agenda and the documents supporting many of the agenda items. If you are planning to have handouts, please bring at least 40 copies for the PAG members and audience.

If you have any questions regarding the PAG or the meeting, please call me at (916) 341-5560. You may also call the liaison to the PAG, Laura Sharpe at (916) 341-5596.

Sincerely,

Craig J. Wilson, Chief
TMDL Listing Unit
Division of Water Quality

Enclosures

cc: Interested Parties

AB 982 Public Advisory Group

Tuesday, July 23rd 2002
9 a.m. to 4 p.m.

Coastal Hearing Room (2nd floor)
Cal/EPA Building
1001 I Street
Sacramento, California

AGENDA

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1. *Convene Meeting – Co-Chairs*   9:00 a.m. – 9:05 a.m.

2. *Introduction*   9:05 a.m. – 9:10 a.m.
   - Steve Ekstrom
   - Description of the meeting: 2002 Section 303(d)
     List Update, Continue Development of the
     Concepts for the SWRCBs Listing and De-
     listing Policy, Legislative Report Update,
     SWAMP Update.

3. *April 8, 2002 Meeting Summary*   9:10 a.m.—9:20 a.m.
   <u>Action Item</u>: Consider approval of Meeting
   Summary (Attached)

4. *Update on the Section 2002 303(d) List*   9:20 a.m.—10:05 a.m.
   - Craig J. Wilson
   - Brief discussion on progress and next steps
   - Schedule
   - Dialogue

5. *Concepts for the Listing/ De-Listing Policy*   10:05 a.m.—12:00 p.m.
   (Attached)
   - Craig J. Wilson
   - Presentation of the Concepts for Developing a
     Policy for Listing and De-listing on California's

Section 303(d) List
- Products and Schedule
- Dialogue/Discussion on the issues.

6. *Lunch*   12:00 p.m.—1:15 p.m.

7. *Concepts for the Listing/ De-Listing Policy*   1:15 p.m.—2:30 p.m.
   (Continued)
   - Dialogue/Discussion on the issues.

8. *Break*   2:30 p.m.—2:40 p.m.

9. *Legislative Report*   2:40 p.m.—3:00 p.m.
   - Laura Sharpe
   - Update on the report
   - Schedule for Completion
   - Dialogue

10. *Update on SWAMP*   3:00 p.m.—3:45 p.m.
    - Del Rasmussen
    - Update on the status of the SWAMP Program
    - Dialogue/Discussion on the issues and
      comments

12. *Wrap- up and Next Steps*   3:45 p.m.— 3:55 p.m.

13. *Public Comment*   3:55 p.m.— 4:00 p.m.

14. *Adjourn*   4:00 p.m.

Agenda Item 3

April 8, 2002 Meeting Summary

AB 982 Public Advisory Group

Radisson Hotel
500 Leisure Lane
Sacramento, California

Meeting Summary

Monday, April 8, 2002

Convene Meeting: Co-Chairs Craig Johns and David Beckman opened the meeting at 9:10 a.m. and declared a quorum.

Introductions: Steve Ekstrom, PAG facilitator, asked members to introduce themselves. He also noted that the primary purpose of this meeting was for PAG to comment on staff's draft report on the 2002 Section 303(d) list, to offer advice on listing/de-listing policy development, and to comment on the proposed outline of the report to the legislature.

Summary of the February 15, 2002 meeting: The summary was accepted as presented, with the exception of the wording of the de-listing consensus item on page 3. Of concern to the regulated community was the wording "for the right reasons." It was agreed that this wording would be addressed under item 5 of the agenda, "Concepts for the Listing/De-listing Policy."

Update on the 2002 Section 303(d) List. Craig J. Wilson gave a brief presentation on the 3-volume draft report, noting that approximately 200 water bodies were added and approximately 70 were removed. Craig also noted there were three public hearings scheduled: May 23 (primary focus will be Regions 1, 2, and 3), May 24 (primary focus will be Regions 5 and 6), and May 30 (primary focus will be Regions 4, 7, 8, and 9). The May 23 and 24 meetings will be at the Cal/EPA Building in Sacramento; the May 30 meeting will be at the Double Tree Hotel/Ontario Airport. It is anticipated that there will be a workshop in September 2002 with the Water Board taking action on the report in the same month.

Comments from the PAG included:

  ➢ Can individuals examine the administrative record? Response: yes, see Vol. 1, page 7 for details.
  ➢ Can new information be introduced at the hearings? The PAG discussed this issue and agreed on the following consensus point:

> *Consensus point: The members of the PAG believe that applicable law and good public policy require the State Board to consider all relevant information in making decisions with respect to the 2002 Section 303(d) list of impaired waters. For that reason, the PAG strongly urges the State Board to accept and reasonably consider such information that may be presented to the State Board on or before the public hearings scheduled in May 2002.* (NOTE: the co-chairs will write a letter to the Board expressing this point.)

➢ Regarding temperature, there seem to be inconsistencies with how certain water bodies are treated – some are on the watch list, some are listed.

➢ Staff are encouraged to use maps so the public can see where the impaired water bodies are.

➢ How can one determine the reach on each listing? Response: that's determined during the TMDL process.

Staff were thanked for their hard work on the draft report.

New Co-chair: David Beckman announced that he will no longer serve as the Co-chair for the environmental caucus, and that Linda Sheehan will assume Co-chair responsibilities. David was thanked for his service, and Linda was welcomed.

Concepts for the Listing/De-listing Policy: This item was continued from the February meeting. Craig Wilson reviewed the items covered at that meeting.

Policy Scope
No additional comments were made.

Listing Concepts
No additional comments were made.

De-listing Concepts
At this point the de-listing consensus item from February was revisited at the request of the regulated caucus. It should be noted that the environmental caucus continued to support the original language, which read, "Assuming a water body is listed for the right reasons, it should not be de-listed before water quality standards are achieved." The regulated caucus had two concerns: (1) "for the right reasons" should be reworded; (2) a water body should be de-listed once an implementation plan is adopted, not when water quality is achieved. The environment caucus believed a water body should remain on the list after an implementation plan is adopted, as this will keep the focus of the public and regulators on the water body.

There was much discussion and it was agreed that the item will not be treated as a consensus point. Assuming water bodies are appropriately listed, the PAG did agree that impaired waters should remain on the list until an implementation plan is adopted. The PAG also agreed that impaired water bodies should be de-listed once water quality standards are achieved. It's the period of time between the adoption of an implementation

plan and achieving water quality standards where the PAG was unable to reach agreement. The regulated caucus felt a water body should be de-listed after an implementation plan is adopted, while the environmental caucus felt a water body should remain on the list until water quality standards are achieved.

<u>Weight of Evidence</u>
Craig Wilson described a variety of factors that influence 303(d) listing and de-listing. The topics discussed were (1) the binomial model used by Florida for assessing if standards are met, (2) the assumptions of the model (such as temporal independence and randomness), (3) data quality, (4) spatial and temporal sample representativeness, and (5) the use of qualitative information in listing decisions.

Comments from PAG included:
  ➢ The policy should include an opportunity for the State to revisit old standards and beneficial uses that are no longer valid and/or appropriate.
  ➢ The data used to support beach closures should be used to list water bodies and not the beach closure itself.
  ➢ A Weight of Evidence approach should include an analysis of multiple lines of evidence.
  ➢ Photographs should be used in conjunction with other lines of evidence and information.
  ➢ If you attempt to quantify non-numeric information, the best professional judgment gets lost.
  ➢ The Florida binomial model should be one tool in the toolbox for determining if a water body should be listed.

The outcome of the discussion was that staff will develop a proposal for the PAG and distribute it in draft prior to the next meeting.

<u>Watch List</u>
There was much discussion on the concept of the watch list. Its purpose was unclear to the PAG, and the term "watch list" was unacceptable. Suggested alternative names included: "action list," "additional monitoring list," and "secondary list."

Staff will develop a proposal for PAG to consider at the next meeting that will include the purpose of the list, criteria for getting on the list, and how the list would be used. Staff will also propose a different name for the watch list.

Content of the Legislative Report: Laura Sharpe noted that the report must be completed by September 30, 2002 so the Board has ample time to consider it before forwarding it to the Governor's office by November 30, 2002. Laura then asked the PAG what they thought the report should include. The following comments were made:

  ➢ On TMDLs completed, show which have implementation plans.
  ➢ Discuss inter-agency relationships.

➢ When discussing 303(d) listing, cite some of the issues PAG has been dealing with.
➢ Add maps to show where monitoring is occurring.
➢ Provide an assessment of the cost of TMDL development, i.e., estimate the number of TMDLs that can be done with current funding.
➢ Provide a flowchart of the TMDL process.
➢ In the monitoring section, show where gaps are, and where monitoring is not occurring.
➢ In the budget section, show the federal contribution and contribution from other sources, e.g., bond money.

Staff were asked to create a timeline for the development and submittal of the report, specifically showing where PAG input will occur.

Additional agenda item – SWAMP update: staff were asked to provide an update on SWAMP. The following was stated:

➢ There will be small cuts this year, mostly out of contracts.
➢ 2nd year work plans are done.
➢ 3rd year draft work plans are due from the Regional Boards by 6/30/02.
➢ The statewide quality assurance plan is almost complete.
➢ SWIM II is not ready yet but SWAMP will store data in a database being developed with the Department of Fish and Game.

Wrap-up and Next Steps: It was agreed that the next meeting of the PAG will be on July 23, 2002 in Sacramento.
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Public Comment: Members of the public were invited to address the PAG.

Adjournment: The meeting was adjourned by the Co-Chairs at 3:40 p.m.

Agenda Item 6

Concepts for Developing a Policy for Listing
and De-listing on California's 303(d) List

State Water Resources Control Board

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TO: AB 982 Public Advisory Group (PAG) Members and Alternates

FROM: Craig J. Wilson, Chief
TMDL Listing Unit
DIVISION OF WATER QUALITY

DATE: July 12, 2002

SUBJECT: DRAFT CONCEPTS FOR DEVELOPING A POLICY FOR LISTING AND DE-LISTING ON CALIFORNIA'S 303(d) LIST

Attached is a concept paper that describes many of the issues that could be addressed by the State Water Resources Control Board in developing its policy for listing and de-listing on California's section 303(d) list.

These concepts are being provided to the PAG to stimulate discussion on the identified policy issues. The presentation of language for discussion should not be viewed as an endorsement of one of the alternative approaches presented.

If you would like to discuss the concept paper before the PAG meeting, please do not hesitate to call me at (916) 341-5560.

Attachment

Concepts for Developing a Policy for Listing and De-listing on California's 303(d) List

This report describes the process by which the State Water Resources Control Board (SWRCB) and Regional Water Quality Control Boards (RWQCBs) could evaluate and recommend waters for revision of California's Clean Water Act section 303(d) list of water quality limited segments. This process is intended to focus on the listing process conducted after 2002.

The document is intended to be used by the AB 982 Public Advisory Group (PAG) to stimulate discussion on the approaches and factors that should be used to list waters on the section 303(d) list. The document is subject to revision and should not be cited or referenced. This document has not been reviewed or approved by the SWRCB.

The report is divided into sections by the various topics that could be addressed in the Listing/De-listing Policy. Under each major topic is a brief description of the issue, alternative ways to address the issue, and, in most cases, language that could be used to implement one or more of the alternatives. In many cases, the language is taken from the listing methodologies from other States, U.S. Environmental Protection Agency (U.S. EPA) guidance, approaches previously used by the SWRCB and RWQCBs, or ideas generated during scoping sessions for the Policy.

Background

Section 303(d)(1) of the federal Clean Water Act (CWA) requires states to identify waters that do not meet applicable water quality standards with technology-based controls alone. Federal regulations also require the identification and priority setting for water quality limited segments still requiring Total Maximum Daily Loads (TMDLs) (40 CFR 130.7(b)). A water quality limited segment is defined as "any segment [of a water body] where it is known that water quality does not meet applicable water quality standards, and/or is not expected to meet applicable water quality standards, even after application of technology-based effluent limitations required by CWA Sections 301(b) or 306."

States are also required to establish a priority ranking of these waters for purposes of developing TMDLs (40 CFR 130.7(b)(4)). The states are required to assemble and evaluate all existing and readily available water quality-related data and information to develop the list (40 CFR 130.7(b)(5)) and to provide documentation to list or not to list a state's waters (40 CFR 130.7(b)(6)).

Section 13191.3(a) of the California Water Code requires the SWRCB, on or before July 1, 2003, to prepare guidelines to be used by the SWRCB and the RWQCBs for the purpose of listing and delisting waters and developing and implementing the total maximum daily load (TMDL) program and total maximum daily loads pursuant to Section 303(d) of the federal Clean Water Act (33 U.S.C. Sec. 1313(d)). In addition, the SWRCB is required to consider the consensus recommendations on the guidelines adopted by the PAG.

The Supplemental Report of 2001 Budget Act also requires the SWRCB to use a "weight of evidence" approach in developing a policy for listing and de-listing waters and to include criteria that ensure the data and information used are accurate and verifiable.

Scope of the Listing/Delisting Policy

Issue: What factors should be addressed by the Listing/De-listing Policy?

Alternatives:

1. Incorporate guidance on listing/de-listing factors only.

2. In addition to incorporating guidance on interpretation of water quality standards, incorporate guidance on beneficial use designation/de-designation and water quality standards revision or development.

3. Incorporate a requirement to revise the entire existing section 303(d) list so it is consistent with the Listing/De-listing Policy.

4. Do not require that the entire section 303(d) list be reviewed. Only change the existing list if new data and information are available and indicate a change is needed.

Language for Discussion:

Policy for Developing California's List of Surface Waters
Not Meeting Water Quality Standards

This Policy describes the process by which the State Water Resources Control Board (SWRCB) and Regional Water Quality Control Boards (RWQCBs) will evaluate and recommend waters for inclusion or removal from California's list of surface waters that do not meet water quality standards. The list created by this Policy includes the Clean Water Act section 303(d) list of water quality limited segments.

This Policy is intended to apply to the listing process conducted to comply with Clean Water Act (CWA) section 303(d). The Policy is to be used to interpret existing numeric and narrative water quality standards to make decisions regarding standards attainment. The Policy shall not be used to (1) determine compliance with any permit or waste discharge requirement provision; (2) to establish, revise, or refine any water quality objective or beneficial use; or (3) translate narrative water quality objectives for the purposes of regulating point sources.

Each water body and pollutant combination identified on the 2002 CWA section 303(d) list shall be evaluated using the provisions of this Policy. This reassessment shall be completed one time. After the reassessment is completed, the existing section 303(d) list shall form the basis for any subsequent lists.

Process: RWQCBs and SWRCB approval of the section 303(d) list

Issue: The SWRCB and RWQCBs have developed the section 303(d) list using a number of different methodologies since 1976. What are the steps in the development and approval of the section 303(d) list?

Alternatives:

1. The process should be managed primarily by the RWQCBs. The SWRCB role is to assemble the RWQCB lists without review or change.

2. The process should be managed primarily by the SWRCB. The RWQCBs will only make recommendations to the SWRCB. The SWRCB will develop the list.

3. The process should be managed by both the RWQCBs and the SWRCB. RWQCBs should use consistent listing/de-listing guidelines and the SWRCB will review consistency with the guidelines.

Process for Discussion:

The process for developing the list of surface waters not meeting standards shall have the following ten steps:

1. RWQCB Solicitation of Existing and Readily Available Data and Information
    Letter to public
    RWQCB search for new data

2. Development of RWQCB Fact Sheets and recommendations on each water body-pollutant/pollution combination

3. RWQCB Public Process
    Hearing
    Board meeting

4. RWQCB Board adoption of Fact Sheets

5. RWQCB submittal of Fact Sheets and <u>all</u> data and information to the SWRCB

6. SWRCB review of RWQCB list recommendations

7. SWRCB evaluation fact sheets
    Completeness
    Review of RWQCB evaluation of data using Policy
    Recommendations

8. SWRCB Statewide List
    Assemble all fact sheets

Develop SWRCB staff recommendations on listing and de-listing
Form comprehensive list

9. SWRCB Public Process
Draft documents
Hearing
Workshop
Meeting

10. SWRCB submittal of List(s) to USEPA

Existing Readily Available Data and Information

Issue: In developing the section 303(d) list, federal regulation requires the SWRCB and RWQCBs to assemble and consider all readily available data and information. To date, each RWQCB has used its judgement in identifying which data and information to use. The SWRCB has not specified the data to be considered in developing the list.

Alternatives:

1. Do not specify the minimum data sets that should be reviewed when RWQCBs are developing their draft section 303(d) lists. Rely on existing federal regulation.

2. Specify general categories of data to consider.

3. Specify very specifically the data sets that will be used. Exclude all other data and information.

Language for Discussion:

The RWQCBs and SWRCB shall assemble and consider all readily available data and information in the development of California's list of surface waters not meeting water quality standards. The data and information shall be reviewed in the following order: submittals resulting from the solicitation, selected data possessed by the RWQCBs, and other sources. At a minimum, readily available data and information includes paper or electronic copies of:

1. The most recent Section 303(d) List, the most recent Section 305(b) Report, and the most recent California Integrated Water Quality Report

2. CWA section 319 nonpoint source assessments

3. Drinking water source assessments

4. Information on water quality problems in documents prepared to satisfy Superfund and Resource Conservation and Recovery Act requirements

5. The most recent Toxic Release Inventory

6. Fish and shellfish advisories, beach postings and closures, or other water quality-based restrictions

7. Reports of fish kills, cancers, lesions or tumors.

8. Dilution calculations, trend analyses, or predictive models for assessing the physical, chemical, or biological condition of streams, rivers, lakes, reservoirs, estuaries, coastal lagoons, or the ocean.

9. Water quality data and information from SWAMP.

10. Water quality problems and existing and readily available water quality data and information reported by local, state and Federal agencies (including discharger monitoring reports); citizen monitoring groups; academic institutions; and the public.

Solicitation of All Readily Available Data and Information

Issue: Assembling all existing and readily available data and information is central in developing and revising the section 303(d) list. While the RWQCBs have access to a number of sources of data, many federal, state, and local agencies as well as the interested public may have data and information that may be useful in developing the list.

How should the SWRCB and RWQCBs solicit readily available data and information?

Alternatives:
1. Do not specify the method or requirements for data submittal.

2. Specify general requirements for data submittal.

3. Require a specific data submittal and quality of data that will be acceptable for development of the section 303(d) list.

Language for Discussion:

The SWRCB shall seek all readily available data and information on the quality of surface waters of the State. To do this, the RWQCBs shall solicit this data and information from the public.

Readily available data and information shall be solicited from any interested party, including but not limited to: private citizens; public agencies; State and federal governmental agencies; non-profit organizations; and businesses possessing data and information regarding the quality of the region's waters.

In general, RWQCBs shall seek all readily available data and assessment information generated since the last listing cycle. For purposes of data and information solicitation, information is any documentation describing the current or anticipated water quality condition of a surface water body. Data is considered to be a subset of information that consists of reports detailing measurements of specific environmental characteristics.   The data and information may pertain to physical, chemical, and/or biological conditions of the Region's waters or watersheds.

Information solicited should contain the following:

- The name of the person providing the information.
- Mailing address, telephone numbers, and email address of a contact person for the information provided.
- Two hard copies and an electronic copy of all information provided. The submittal must specify the software used to format the information and provide definitions for any codes or abbreviations used.
- Bibliographic citations for all information provided.
- If computer model outputs are included in the information, provide bibliographic citations and specify any calibration and quality assurance information available for the model(s) used.

Data solicited should contain the following:

- Data in electronic form, in spreadsheet, database, or ASCII formats. The submittal must specify the format and define any codes or abbreviations used in the database.
- Metadata for the field data, i.e., when measurements were taken, locations, number of samples, detection limits, and other relevant factors.
- Metadata for any Geographical Information System data must be included. The metadata must detail all the parameters of the projection, including datum.
- A description of and reference for the quality assurance procedures.
- Two hard copies of the data.
- In addition, data from citizen volunteer water quality monitoring efforts needs:
  - The name of the group;
  - Indication of any training in water quality assessment completed by members of the group

Data and information previously submitted to the RWQCBs, such as Discharge Monitoring Reports, should not be solicited as the data and information is already available to the RWQCBs. Data and information not submitted to the RWQCBs by interested parties is considered to be not readily available.

Assessment Methodology

Issue: The SWRCB and RWQCBs are required to provide the U.S.EPA with the methodology used to develop the section 303(d) list. How detailed and specific should the State's methodology be? Should the SWRCB specify the types of data to solicit and how data will be evaluated using a weight-of-evidence approach?

Alternatives:

1. Do not specify the assessment methodology. Allow each RWQCB to use its own approach and make its own judgements of the methodology to use.

2. Use the methodology used by the RWQCBs to develop the 1998 section 303(d) list.

3. Use the methodology used by the SWRCB to develop the 2002 section 303(d) list.

4. Use an approach that allows each RWQCB to interpret water quality objectives as specified in the Basin Plans and, in the absence of Basin Plan guidance, use their best professional judgment to develop the list. Provide guidance on acute, chronic, one-time, and recurring water quality problems.

5. Develop a nested approach that would require the specific interpretation rules for quantitative data or allow the use of all data available to make judgements about listing. This approach would set specific rules for the types and amount of numeric data to use in assessing standards attainment and would also allow the use of non-quantified data and data not meeting the specific requirements if multiple lines of evidence are available.

6. Use an approach based on the U.S. EPA's guidance on development of the section 305(b) report and section 303(d) list (Integrated Report Guidance dated November 19, 2001).

7. Use Florida's listing and de-listing approach. This approach includes the use of planning and verified lists, the binomial model for assessment standards attainment, specific guidelines for the various types of standards and parameters used to develop the section 303(d) list.

8. Use Arizona's listing and de-listing approach. This approach includes an evaluation of credible data, the use of a planning list, weight-of-evidence, binomial model, and general guidance on interpreting narrative standards.

9. Use Texas' listing and de-listing approach. This approach includes identification of sources of data, interpretation of numerical data using the binomial model, assessment of use support, and assessment of "secondary concerns" (exceedance of guidelines not adopted as standards).

10. Use a risk management model based on the weight of evidence approach developed for Massachusetts. Approach provides numerical and narrative methods for

assessing the quality of the data and information available to interpret aquatic life protection.

11. <u>Develop a California-specific Weight-of-Evidence Approach</u>. Select a variety of approaches or techniques in order to best fit California's needs. The approach should be specific enough to allow the interested public to see the steps, the data, and the evaluation used to develop the list. Specify which data is sufficient by themselves and which data require multiple lines of evidence.

Concept for discussion:

Evaluation of readily available data and information using a weight-of-evidence approach

There are certain conditions that are *sufficient by themselves* to demonstrate that water quality standards are not attained. Other conditions may require evaluation of multiple types of data or pieces of information in order to arrive at a reasonable determination of whether standards are attained. In some instances, the available data and information may yield conflicting information as to whether or not water quality standards are met or beneficial uses are attained. Therefore, the weight of evidence approach follows a two-step process to accommodate the variety of data that might be encountered.

The first step of the determination process is to screen the available data and information for an adequate data subset of known quality and sufficient spatial and temporal coverage for comparison with that specific set of conditions that are *sufficient by themselves* to demonstrate standards attainment. These listing factors are:

Numeric data exceeds numeric water quality objectives, maximum contaminant levels, or California/National Toxics Rule water quality criteria.

Consumption of Aquatic Species

Beach Posting or Closure

The second step is to consider the available data and information using a variety of listing factors that require multiple lines of evidence for listing. The listing factors that require multiple lines of evidence are:

Toxicity

Health Advisories

Nuisance

Adverse Biological Response

Degradation of Aquatic Life Populations or Communities

Documentation

Issue: Evaluation of the data and information for listing waters of the section 303(d) list is often complex. In order for the listing decision to be transparent, the assessment of the data and information should be presented in a way that allows for the RWQCBs and the SWRCB to understand the reasons for each proposal. What kinds and amounts of documentation are needed to support the section 303(d) listing process?

Alternatives:

1. <u>Each RWQCB should be allowed to document their recommendations in any manner they deem appropriate</u>. No or minimal changes in RWQCB workload.

2. <u>The SWRCB should specify some general guidance for the factors that should be documented</u>. Perhaps use another State's documentation requirements such as Texas.

3. <u>Develop water body specific fact sheets that describe all the data and information pertaining to the specific water body</u>. Only provide fact sheets for waters recommended for listing and de-listing. These types of requirements would put a new workload on the RWQCBs. At present there is no dedicated funding source for completing the section 303(d) list.

4. <u>The SWRCB should require the RWQCBs to submit specific information in a standard format so the Board and the public have a clear idea of the data used, the quality of the data, what the data represent, which water quality standards are exceeded, and the other important information about the listing</u>. These types of requirements would put a new workload on the RWQCBs. At present there is no dedicated funding source for completing the section 303(d) list.

Language for Discussion:

RWQCB Fact Sheet Preparation
Each RWQCB shall prepare fact sheets for each waterbody-pollutant/pollution combination that is proposed for listing or de-listing from the list of water quality limited segments. The fact sheets shall present a description of the evidence used to support each component of the weight of evidence approach. Fact sheets shall be prepared for all data and information solicited (even for data not used to support a new listing or de-listing). The fact sheets shall contain the following:

A. Region
B. Type of water body (Bay and Harbors, Coastal Shoreline, Estuary, Lake/Reservoir, Ocean, Rivers/Stream, Saline Lake, Tidal Wetlands, Freshwater Wetland)
C. Name of water body segment (including Calwater watershed)
D. Pollutant or type of pollution
E. Medium (water, sediment, tissue, habitat, etc.)

F. Water quality standards (copy applicable standard from appropriate plan or regulation) including:
- Beneficial use
- Numeric water quality objective/water quality criteria plus metric (single value threshold, mean, median, etc.) <u>or</u> narrative water quality objective plus guideline(s) used to interpret
- Antidegradation (if applicable to situation)
- Any other provision of the standard used

G. Description of numeric data
- Quality assurance
- Standard methods used
- Spatial representation, size affected (including map)
- Temporal representation
- Site-specific information
- Age of data
- Effect of seasonality
- Events/conditions that might influence data evaluation (e.g., storms, flow conditions, laboratory data qualifiers, etc.)
- Number of samples
- Number of samples exceeding guideline or standard
- Source of data

H. Description of non-numeric data and information
- Types of observations
- Spatial representation, size affected (including map)
- Reference conditions (if appropriate)
- Temporal representation
- Site-specific information
- Age of information
- Effect of seasonality
- Events/conditions that might influence information evaluation (e.g., storms, flow conditions, laboratory data qualifiers, etc.)
- Number of samples or observations
- Number of samples or observations exceeding guideline or standard
- Perspective on magnitude of problem
- Numeric indices derived from qualitative data
- Source of information

I. Potential source of pollutant or pollution (including permits, waste discharge requirements, natural sources, etc.)

J. Program(s) addressing the problem, if known

K. Data entry into GeoWBS (Geographic Water Body System)

L. Data evaluation (see below)

M. Recommendation (see below)

N. Priority ranking (see below)

O. TMDL schedule (see below)

If the data and information reviewed do not indicate a listing or de-listing decision can be made, the fact sheet may address multiple pollutant/pollution-water body combinations.

Interpreting Narrative Water Quality Objectives

Issue: Many water quality standards are narrative and consequently, subject to substantial subjectivity in interpretation. Narrative standards typically take the form: No toxics shall be discharged in toxic amounts.

Federal regulation explicitly states that narrative water quality standards should be assessed in developing the section 303(d) list. RWQCBs have used a variety of guidelines or scientifically derived values to interpret narrative standards.

Given that narrative standards can be interpreted subjectively, how best can the SWRCB and RWQCBs strengthen the use of chemical, physical, and biological data in the assessment of narrative water quality standards?

Alternatives:

1. Do not allow the use of any guidelines for interpreting narrative water quality standards.

2. On a case-by-case basis, allow RWQCBs to establish the method and approach for interpreting narrative water quality standards.

3. Establish general guidance on the requirements for the interpretation of narrative standards. State the types of interpretative guidelines that may be used. Provide guidance on how to interpret high natural background concentrations.

4. Establish explicit guidance for specific parameters which guidelines should be used. List the guidelines in the Policy.

Language for Discussion:

Narrative water quality objectives shall be interpreted using the following guidelines:

Beneficial Use	Evaluation Criteria for Measurement Endpoints
Aquatic Life	NAS tissue guidelines, BPTCP approaches to identify toxic hot spots, published temperature thresholds; published sedimentation thresholds; Federal agency and other state sediment quality guidelines, DFG guidelines, Sediment Apparent Effects Thresholds from California and other states, toxicity guidelines
Fish Consumption	NAS tissue guidelines, FDA action levels, U.S. EPA screening values fish advisories, State Action levels; MTRLs calculated from water quality objectives or criteria; Fish and Shellfish Consumption Advisories
Shellfish Harvesting	WQO (Ocean Plan), Shellfish harvesting bans
Drinking Water	DHS Primary MCLs, Secondary MCLs; EPA Primary MCLs, Secondary MCLs; MCL goals; OEHHA Public Health Goals (PHGs); DHS Action Levels; Drinking Water Health Advisories; Water Quality Advisories; Suggested No-Adverse-Response Levels (SNARLs); Prop 65 levels; CalEPA, USEPA and NAS drinking water Cancer Risk
Swimming, Non-contact recreation	DHS bacterial standards, beach closures and postings
Agricultural Water Supply	Agricultural Water Quality Goals published by the Food and Agriculture Organization of the United Nations
Aesthetics	For taste and odor: certain CTR, WQO, and other published thresholds.
No relationship to BU and should not be used	SMW EDL

When site-specific natural background concentrations in water or sediment are higher than necessary to protect beneficial uses, the natural background concentration is considered to comply with the narrative water quality standard.

Listing Factors and De-listing Factors

Issue: Interpretation of data and information to determine if water quality standards are attained is central to development of the section 303(d) list. Should the SWRCB present in the Policy the approaches and methods for interpreting each type of water quality standard? What is the relationship among the various factors? Should interpretation of standards be tempered by the controllability of the pollutants?

Alternatives:

1. List if any type of water quality standard is not met. Implement U.S. EPA's policy of independent applicability.

2. Do not list if it can be demonstrated that the beneficial use is not impacted even though numeric water quality standards are not met. This option is not legal. Water quality objectives are part of water quality standards. Waters must be listed if standards are not met, not merely if beneficial uses are not protected.

3. Exclude short-term events such as spills and permit violations from the list. This option may be inconsistent with federal regulations.

4. List only for controllable sources of pollutants or pollution. Establish statewide policy for determining the standard if background concentrations of naturally occurring substances are high.

5. Place waters on the list if effluent limits are stringent enough to implement water quality standards but are not enforced.

Language for Discussion:

As a preface to the listing factor section:

Waters shall be listed upon sufficient credible data and information that indicate water quality standards are not met or beneficial uses are not attained. In all cases, data and information that is collected during a known spill or a violation of a permit requirement or waste discharge requirement shall not be used in the assessment of standards and beneficial use attainment.

For each pollutant/pollution-water body combination potentially caused by controllable sources, if a segment of a water body meets any one or more of the following conditions, the segment is considered to be a water quality limited segment and shall be placed on the *California List of Surface Waters Not Meeting Water Quality Standards*:

After the listing factor section:

De-listing Factors
A water body shall not be placed on *California's List of Surface Waters Not Meeting Water Quality Standards* if the existing and readily available data and information indicate that a water body is not a water quality limited segment (i.e., does not meet the conditions specified for one of more of the listing factors).

If objectives or standards have been revised and the site or water body is no longer a water quality limited segment then the segment should be reevaluated for placement in the appropriate category.

The category of a segment should be reevaluated if the beneficial use not attained has been de-designated (after U.S. EPA approval of a Use Attainability Analysis) and the segment is no longer considered to be a water quality limited segment.

The category of a segment should be reevaluated if the listing was based of faulty data. Faulty data include, but are not limited to, typographical errors, improper quality assurance/quality control procedures, or limitations related to the analytical methods that would lead to improper conclusions regarding the water quality status of the segment.

Data Quality

Issue: A wide range of data has been used in the past for 303(d) listing and delisting of water bodies. Knowing the quality of these data is essential in determining the strength of the recommendation to list a water body. In developing the 303(d) list what data quality should be required?

Alternatives:

1. Use all data of any quality or of unknown quality to make decisions to list or de-list waters.

2. The SWRCB should provide only general guidance on the quality of data that is acceptable.

3. The SWRCB should establish specific guidelines on the quality of numeric data to be used in the 303(d) listing process.

4. The SWRCB should provide specific guidance on data quality but should allow data of lesser or unknown quality to be used as long as these data of poorer quality are used only to support high quality data.

5. Use all data and information, as required by federal regulations, but ascribe varying weight depending on the confidence level of the data. Any data not used must have a clear basis for not using it.

Language for Discussion:

Assessment of numeric data quality
The quality of the data used in the development of the section 303(d) list should be of sufficiently high quality to make determinations of water quality standards attainment. Quantitative data are of little use unless accompanied by descriptions of sample collection, the analytical methods used, quality control protocols, and the degree to which data quality requirements are met.

Data supported by a Quality Assurance Project Plan (QAPP) pursuant to the requirements of 40 CFR 31.45 then the data are acceptable for use in developing the section 303(d) list. The data from major monitoring programs in California are considered of adequate quality. The major programs include SWAMP, the Southern California Bight Projects of the Southern California Coastal Water Research Project, U.S. Geological Survey, U.S. Environmental Protection Agency's Environmental Monitoring and Assessment Program, the Regional Monitoring Program of the San Francisco Estuary Institute, and the Bay Protection and Toxic Cleanup Program (BPTCP).

Data without rigorous quality control can be useful (in combination with high quality data and information).   If the data collection and analysis is not supported by a QAPP or if it is not possible to tell if the data collection and analysis was supported by a QAPP, then the data and information cannot be used by itself to support listing or delisting of a water segment. These data may only be used to corroborate other data and information with an appropriate QAPP.

The RWQCBs should clearly evaluate and make a finding in the fact sheets on the appropriateness of data collection and analysis practices. If any data quality objectives in the QAPP are not met, the reason for not meeting them and the potential impact on the overall assessment should be clearly documented.

Age of Data

Issue: An underlying assumption of the listing process is that the assessments made today represent conditions in State's waters. If very old data are used to make the assessment the likelihood of those data represent current conditions is low. Also, as methods for sampling and analysis improve older data may be of lesser relevance or quality. In each case, the RWQCBs and SWRCB must determine how much of the data collected over time is relevant to the listing or de-listing decision.

Alternatives:

1. Determine on a case-by-case basis which data should be used in the 303(d) assessments.

2. Establish guidance that data older than five years should not be used in the assessments.

3. Establish guidance that data older than seven years should not be used in the assessments.

4. Establish guidance that data older than ten years should not be used in the assessments.

5. Establish specific guidance as described in Alternatives 2 or 3 and allow the use of older data to support the findings based on newer data. Data collected at the site within past 5 years for water and 10 years for sediment, tissue, and persistent organic chemicals is acceptable.

Language for Discussion:

Only the most recent XX year period of data and information shall be used for listing or delisting waters on the section 303(d) list. Data older that XX years may be used on a case-by-case basis if the older data are used in conjunction with newer data to demonstrate trends or if the conditions in a water body have not changed. In either case, the reason for using older data shall be described in the water body fact sheet.

Water Body-specific Information

Issue: Confidence in the monitoring data and information is increased if it comes from the water body segment under consideration. In the absence of water body-specific data and information, should data be applied to other similar water bodies?

Alternatives:

    1. Allow RWQCBs to establish on a case-by-case basis the water body-specific conditions necessary to list or de-list a water body.

    2. Establish general guidance on the requirements for water body-specific conditions so the data evaluated represents the specific water body.

    3. Establish more specific guidance for various water quality parameters.

Language for Discussion:

Data used to assess water quality standards attainment should be actual data that can be quantified and qualified. Information that is estimated, modeled, or projected shall not be used for listing or de-listing decisions. In order to be used in developing the list:

1. Data must be measured at one or more sites in water body

2. Environmental conditions in a water body or at a site must be taken into consideration (e.g., effects of seasonality, events such as storms, the occurrence of wildfires, land use practices, etc.)

Temporal Representation

Issue: Should minimum temporal requirements be established for the data to be sufficiently representative?

Alternatives:

1. Allow RWQCBs to establish on a case-by-case basis the temporal representativeness of the samples used to assess standards attainment.

2. Establish general guidance on the requirements for temporal representation so samples represent multiple seasons and avoid representing short-term events.
   Options: Sampling must be from at least two seasons
   Sampling must be from at least three seasons
   At least two events.
   No more than two thirds of the sampling from any one year.

3. Establish more specific guidance for water quality parameters on the requirements for temporal representation.

Language for Discussion:

Samples shall be collected to be representative of temporal characteristics of the water body. Samples used in the assessment must be temporally independent.

In general, samples should be collected on multiple days during more than XX season(s) or more than XX event(s) when effects would be expected to be clearly manifested. The minimum data set shall be for XX year(s) and shall cover at least XX seasons (at least XX sampling events). No more than XX (percentage) of the data set shall be collected in one year. Samples collected less than XX days apart shall be combined and considered one sampling event.

If the majority of samples are collected on a single day or during short-term natural event (e.g., a storm, flood, wildfire), the data shall not be used as the primary data set to supporting the listing.

Spatial Representation

Issue: Should minimum spatial requirements be established for the data to be sufficiently representative?

Alternatives:

1. Allow RWQCBs to establish on a case-by-case basis the spatial representativeness of the samples used to assess standards attainment.

2. Establish general guidance on the requirements for spatial representation so samples represent the intended geographical extent.

    Options: 200 meters (Florida)
            50 meters separation for bacterial standards or beach postings

3. Establish more specific guidance for water quality parameters on the requirements for spatial representation.

Language for Discussion:

Samples shall be collected to be representative of spatial characteristics of the water body. To the extent possible, all samples should be collected to statistically represent the segment of the water body or collected in a consistent targeted manner that represents the segment of the water body.

Samples collected within XX meters of each other shall be considered the same station or location. Samples from mixing zones generally should not be included as part of the data set.

The fact sheet shall contain a description of pertinent factors such as the depth of water quality measurements, flow, hardness, pH, the extent of tidal influence, and other relevant sample-specific factors.

Minimum Number of Samples

Issue: Should a minimum number of samples be defined to make listing and de-listing decisions?

Alternatives:

1. Allow RWQCBs to establish on a case-by-case basis the number of samples to be used to assess standards attainment.

2. Establish general guidance on the requirements for the number of samples to make listing or de-listing decisions or when no decision will be made.

3. Establish water body type guidance for specific parameters on the requirements for numbers of samples.
   Options: Select minimum number of samples to list: 1, 2, 3, 4, 10, 20, or ?
              Select minimum number of samples to de-list: 8, 18, 28, 29, 45, or ?

Language for Discussion:

For assessment of numeric water quality objectives or water quality criteria, a minimum of XX temporally independent samples from each water body segment for the most recent XX year period are needed to determine if water quality standards are exceeded.

For entire water bodies, field measurements, constituents in water, sediment, or tissue collected at multiple sites may be aggregated to meet the minimum requirement. Field measurements and constituents in water should be collected on different days to be included in the minimum number of samples.

For segments of water bodies, fewer than XX samples for biological assessments and tissue measurements may be used on a case-by-case basis.

Data sets with fewer than X samples should receive high priority for monitoring.

Water quality data should not be used in the development of the list when the are X or fewer samples.

Analysis of Numeric Data

Issue: Once it is determined that numeric data is of sufficient quality and quantity, it is necessary to determine whether water quality standards are met. The RWQCBs and SWRCB must answer the question: Are standard achieved? The answer is either "yes" or "no." The challenge is to interpret the sometimes limited amount of data to determine if water quality standards are not met and the water should be listed.

In order to assess the status of a water body, samples are collected and analyzed. The goal is to measure a representative sample of the water body so the samples represent the conditions in the natural environment. Consequently, the potential for error exists in every decision and, depending on circumstances, can be great. The goal is to deduce <u>actual</u> water body conditions and make reliable decisions from water quality sample data. In the case of 303(d) listing, the goal is to identify those waters that are not meeting or are not expected to meet standards.

Alternatives:

1. Use raw score approach suggested by U.S. EPA in the section 305(b) guidance.

2. Use binomial model advocated by other states such as Florida, Nebraska, Texas, and Arizona.

3. Use Bayesian Binomial Model advocated by the state of Virginia. This approach allows for use of prior understanding and data to assess if standards are attained.

Further Discussion:

In order to carefully assess if standards are met, statistical procedures can be used to manage the errors. To use a statistical approach, decisions need to be made about (1) the hypotheses to test, (2) percentage of samples that are allowed to exceed the water quality standard, and (3) the magnitude of error that will be tolerated.

The major focus is on evaluating concentrations of pollutants in water, sediment, and tissue samples. It is also probable that the evaluation will be comprised of a small number of samples that, in turn, can cause large uncertainty. The Binomial Model has been used by many states to list and de-list water bodies. The binomial approach has been challenged and is in litigation.

Assumptions/requirements of Binomial Distribution Model

- Samples (trials/observations) give either a "yes" or "no" answer (i.e., dichotomous response).

- The probabilities (p, 1-p) of "yes" and "no" responses remain constant.

- Samples are finite in number (n).

- Samples are randomly collected. In other words, the samples are collected in a manner that represents the conditions of the water body of interest. If repeated samples are collected during a storm event, the samples do not represent any thing other than storm conditions.

- Samples are identical (consistent).

- Samples are independent.

Advantages of Binomial Distribution Model

- Nonparametric (e.g., computational simplicity and more "power" [1-β] than equivalent parametric test when test assumptions <u>not</u> met).

- Distribution best "fits" yes-no (dichotomous response) type of data.

- Well understood.

- Easy to calculate (e.g., using Excel).

Disadvantages of Binomial Distribution Model

- Does not take into account <u>magnitude</u>--how great was any one exceedence?

- Does not appear to address <u>time extent</u>--how prevalent was exceedence?

- Unfamiliarity--not used by SWRCB and RWQCB staff before.

- May appear overly complicated to non-scientific/technical public.

Hypothesis Testing

Hypothesis testing is a way to make inferences using statistics. To use this type of statistical testing, a null hypothesis must be developed. The null hypothesis represents the *status quo*. For example:

- A water body is not yet listed and should not be listed.

- A water body was previously listed and should remain listed.

If the data collected or used are very different from what would be expected, assuming the null hypothesis is true, then the null hypothesis is rejected. If the data are not at variance with what would be expected, assuming the null hypothesis is true, then the null hypothesis is not rejected. A null hypothesis is not accepted just because it is not rejected.

Listing

H_0 (null hypothesis) = Actual conditions do <u>not</u> exceed a water quality standard some critical percentage of the time (i.e., $p \leq p_0$). Preliminary assumption: Water quality standards are being met and the water body should <u>not</u> be listed.

H_a (alternate hypothesis) = Actual conditions exceed the standard more than some critical percentage of the time (i.e., $p > p_0$).

Decision	**H_0 True** (standards met)	**H_0 False** (standards not met)
Reject H_0 (list)	**Type I Error** (list when inappropriate to)	Correct Decision
Do not reject H_0 (do not list)	Correct Decision	**Type II Error** (do not list when appropriate to)

The model uses dichotomous (yes/no) data. Samples either (a) do <u>not</u> exceed ($\leq$) ("no") or (b) exceed ($>$) ("yes") some water quality standard.

p = the <u>true</u> probability (from 0 to 1) that <u>any</u> sample from a water body segment will exceed a particular criterion. Unfortunately, this is impossible to know. Since we cannot know <u>actual</u> conditions (i.e., p), we generate an estimate (p_s) by sampling, then evaluate various hypotheses.

p_0 = "cutoff" value (e.g., 10% or 0.10 is used by a number of states and several RWQCBs); a policy choice--the pre-selected basis for (listing/delisting) decisions

An important goal is to minimize the chance of **Type I** error (i.e., keep Type I error low, confidence high (e.g., $\geq$ 95%)). To do this requires a suitable <u>minimum</u> number of exceedences per sample in order to achieve desired confidence level. Type I error can be addressed either in the listing process or prior to TMDL development through a de-listing process.

De-listing

H_0 = Actual conditions exceed a standard some critical percentage of the time or more [i.e., $p \geq p_0$]. Preliminary assumption: Water quality standards are not being met (i.e., original listing was correct) and the water body should <u>not</u> be de-listed.

H_a = Actual conditions exceed a standard less than some critical percentage of the time [i.e., $p < p_0$].

Decision	H₀ True (standards not met)	H₀ False (standards met)
Reject H₀ (de-list)	**Type I Error** (de-list when inappropriate to)	Correct Decision
Do not reject H₀ (do not de-list)	Correct Decision	**Type II Error** (do not de-list when appropriate to)

It is also a goal to m minimize the chance of **Type I** error in delisting. To do this requires a suitable <u>maximum</u> number of exceedences per sample in order to achieve desired confidence.

Allowable percentage of samples that can exceed the standard

With complete understanding of a water body, any exceedance of a water quality standard would indicate that a water body does not meet water quality standards. However, a complete understanding of our waters is not possible because decisions are made with limited data that are greatly affected by variability in natural or background conditions and in human activity. Other sources of variability include measurement error in the analysis of samples (typically for measurements of metals and organic chemicals, data quality requirements for accuracy and precision range from 10 to 30 percent differences are allowed).

The U.S. EPA has recognized these factors and at least for the section 305(b) requirements, has allowed that if >10 percent of the samples for any acute or chronic criterion does not support beneficial uses (assuming at least 10 samples over a three year period).

Magnitude of Error

α ("alpha") = Chance of a **Type I** error (i.e., rejecting null hypothesis when it is true).
β ("beta") = Chance of a **Type II** error (i.e., not rejecting the null hypothesis when it is false). **(α and β are <u>not</u> necessarily directly related.)**

Scientists normally pre-select a desired α (e.g., 1%, 5% or 10%). Test results determine whether α is achieved and **H₀** is rejected. **1-α (confidence)** = the chance of <u>not</u> rejecting the null hypothesis when it is indeed true (e.g., 99%, 95%, or 90%).

In the 303(d) process the selection of α is a policy decision. Selecting a low α decreases the chance of making the mistake to list when we should not. A larger α requires fewer samples to list but many more "no hits" to de-list. The challenge is to balance the selection of α. The goal is to minimize the chance of α (**Type I** error) and to not list unless appropriate to while keeping confidence (1-α) high. The α error is controlled by requiring a suitable <u>minimum</u> number of exceedences per sample size in order to achieve desired 1-α.

β is minimized (and **1-β** maximized) primarily by increasing sample size (***n***). **1-β** (**"power"**) = the chance of rejecting the null hypothesis when it is indeed false. β is controlled by selecting the minimum sample size and the resources available for monitoring.

Examples

Minimum Number of Exceedences to <u>List</u>
Water Body with Various Confidences (1-α) (p_0= **0.10**)

n	80%	90%	95%	99%
4	1	1	2	2
5	1	1	2	2
10	2	2	3	4
15	2	3	4	5
20	3	4	4	6
30	4	5	6	7
40	6	6	7	9

Minimum Number of Exceedences to <u>List</u>
Water Body with Various Confidences (1-α) (p_0= **0.20**)

n	80%	90%	95%	99%
4	1	2	2	3
5	2	2	3	3
10	3	4	4	5
15	4	5	6	7
20	5	6	7	8
30	8	9	10	11
40	10	11	12	14

Maximum Number of Exceedences to <u>*De*</u>-List
Water Body with Various Confidences (1-α) (p_0= **0.10**)

n	80%	90%	95%	99%
10	0	0	0	0
18	1	0	0	0
28	1	1	0	0
29	2	1	1	0
45	3	2	1	1
50	3	2	2	1
100	7	6	5	4

Maximum Number of Exceedences to <u>De</u>-List
Water Body with Various Confidences (1-α) **(p_0 = 0.20)**

<u>n</u>	<u>80%</u>	<u>90%</u>	<u>95%</u>	<u>99%</u>
8	1	0	0	0
11	1	1	0	0
15	2	1	1	0
21	3	2	1	1
30	4	3	3	1
40	6	5	4	3
50	8	6	6	4
100	17	15	14	11

Listing Factor 2: Numeric Bacterial Water Quality Standards

Issue: How should numeric bacterial water quality standards be interpreted?

Alternatives:

1. Do not use this factor.

2. Interpret case-by-case.

3. Establish consistent value to trigger listing. Distinguish between wet-weather and dry-weather conditions.

Language for Discussion:

The segment exceeds bacterial standards more than 10 percent of the days (>36.5 days per year) as measured by the number of beach posting days by the local environmental health agency. When consecutive years are used (the time period between the 303(d) listing periods) the number of beach postings will not exceed the 10 percent threshold in two of three consecutive years in the time period. All the postings from routine beach water quality monitoring should be considered in the assessment time period except for those considered non-routine by the local environmental health agency. The number of "rain advisory" days (when rain advisories are issued by the local health agency) should not be included in the assessment.

Samples collected to assess bacterial water quality standards shall represent 50 meters on each side of monitoring station unless:

• Adaptive sampling data are available indicating a broader length of beach is impaired by the discharge.

• Two adjacent monitoring stations are linked by hydrological conditions. In this case the beach segment between the stations is listed as well as the 50 meters on each side.

• Flow rates are known and indicate a broader length of beach that do not meet standards.

Listing Factor 3: Health Advisories

Issue: How should health advisory information be interpreted?

Alternatives:

1. Use only OEHHA advisories.

2. Use all types of advisories.

3. Association determined by comparison to water or sediment values.

4. Association determined case-by-case (do not specify in Policy).

Language for Discussion:

When a health advisory against the consumption of edible resident non-migratory organisms or a shellfish harvesting ban has been issued by Office of Environmental Health Hazard Assessment (OEHHA) or Department of Health Services (DHS), the segment is automatically considered to be a water quality limited segment if the chemical or biological contaminant is associated with sediment or water in the segment.

Listing Factor 4: Tissue

Issue:　　　How should chemical residue concentrations in tissue be interpreted?

Alternatives:
　　　1.　Do not use this factor.

　　　2.　Interpret case-by-case.

　　　3.　Establish consistent value to trigger listing.
　　　　　　Options:
　　　　　　　　Raw score approach (select percentage exceeded)
　　　　　　　　Binomial model (select percentage exceeded plus confidence level,
　　　　　　　　select number of minimum measurements)
　　　　　　　　　More Options:
　　　　　　　　　　Exceedance percentage (1%, 5%, 10%, 20%, 50%, ?)
　　　　　　　　　　Listing confidence level (99%, 95%, 90%, 85%, 80%, ?)
　　　　　　　　　　De-listing confidence level (1%, 5%, 10%, 15%, 20%, ?)
　　　　　　　　Binomial model 2 (allow varying confidence level to get on/off list)

Language for Discussion:

The tissue pollutant levels of organisms collected from a segment exceed levels established by FDA for the protection of human health or the NAS for the protection of human health or wildlife, MTRLs, measurement endpoints from other State and federal agencies, other states, and other countries. This factor shall be used to translate appropriate narrative water quality objectives.

Acceptable tissue concentrations are measured either as muscle tissue (preferred) or whole body residues. Residues in liver tissue alone are not considered a suitable measure. Animals can either be deployed (if a resident species) or collected from resident populations. Recurrent measurements in tissue are required. Residue levels established for one species for the protection of human health can be applied to any other consumable species.

Shellfish: To use tissue data, each data point should include a minimum of three replicates. The value of interest is the average value of the three replicates. Each replicate should be comprised of at least 15 individuals. For existing State Mussel Watch information related to organic pollutants, a single composite sample (20-100 individuals), may be used instead of the replicate measures.

Fin-fish: A minimum of three replicates is necessary. The number of individuals needed will depend on the size and availability of the animals collected; although a minimum of five animals per replicate is recommended. The value of interest is the average of the three replicates. Animals of similar age and reproductive stage should be used.

AND/OR

Water Chemistry: When considering whether to list a segment of a water body, use a statistical comparison that assumes (1) a binomial distribution of the observations, (2) the tissue guideline is exceeded in XX percent of the samples, and (3) a listing (listing when in fact it should be) confidence level of XX percent. Therefore, list a water body or site if the guideline is exceeded in at least XX temporally independent samples from a sample size of XX with a confidence level of XX percent. For sample sizes greater than XX, the number of samples that exceed the standard will be calculated using Microsoft Excel® function:

CRITBINOM (sample size, XX% exceedance probability, XX% listing confidence level).

When considering whether to remove a segment of a water body from the list use a statistical comparison that assumes (1) a binomial distribution of the observations, (2) the tissue guideline is exceeded in XX% of the samples, and (3) a false de-listing (de-listing when in fact is should not be) confidence level of XX percent. Therefore, de-list a water body or site if standards are not exceeded in at least XX temporally independent samples. For sample sizes greater than XX, the number of samples that may exceed the standard will be calculated using Microsoft Excel® function:

CRITBINOM (sample size, XX% exceedance probability, XX% false de-listing confidence level).

Listing Factor 5: Beach Postings and Closures

Issue: How should beach postings and closures be interpreted?

Alternatives:
1. Do not use this factor.

2. Interpret case-by-case.

3. Establish consistent value to trigger listing.

Language for Discussion:

Coastal and inland bathing areas have been posted more than 37 days per year for at least two out of three consecutive years or for at least three years out of six consecutive years. Permanent postings backed by bacterial indicator densities measured in the segment shall also be used for this assessment. This factor shall be used to translate appropriate narrative water quality objectives.

Beach Closures are acute episodes usually caused by a sewage spill or another kind of single source contamination. Closure events should be addressed by enforcement of existing permits, waste discharge requirements, basin plans, and other regulatory authority. TMDLs should be used to address beach closures if they cannot be address by other means.

Listing Factor 6: Toxicity

Issue: Toxicity measurements can assess the response of aquatic organisms to pollutants. The use of a number of different organisms ensures a greater opportunity to identify problematic conditions. Toxicity can be assessed in relation to either complex mixtures or individual substances. It can also be evaluated on the basis of acute or chronic exposures in test systems. The determination of an array of toxicity testing endpoints ranging from lethality, through critical life stages, will allow the evaluation of a variety of effects.

Alternatives:

1. Do not use this factor.

2. Interpret case-by-case.

3. Establish consistent value to trigger listing.
> Options:
>> Establish number of hits to list or number of "no hits" to de-list (e.g., two or more tests with significant toxicity, one test in past 7 years with significant toxicity, etc.)
>> Establish percent difference from control that should be used to determine toxicity
>> Use BPTCP reference envelope approach to determine toxicity
>> Establish values and approach for association assessment
>> Binomial model (using low number of measurements)
>>> More Options:
>>>> Exceedance percentage (1%, 5%, 10%, 20%, 50%, ?)
>>>> Listing confidence level (99%, 95%, 90%, 85%, 80%, ?)
>>>> De-listing confidence level (1%, 5%, 10%, 15%, 20%, ?)
>> Establish methods to use or that are acceptable.

4. Establish general very specific guidance on the requirements for the interpretation of narrative standards. State the types of interpretative guidelines that may be used. Provide guidance on how to interpret background toxicity.

Language for Discussion:

Water or sediment exhibits toxicity associated with pollutants that is significantly different from the toxicity observed at reference sites or using reference conditions (*i.e.*, when compared to the lower confidence interval of the reference envelope or, in the absence of a reference envelope, is significantly toxic as compared to controls (using a t-test) and the response is less than 90 percent of the minimum significant difference for each specific test organism). This factor shall be used to translate appropriate narrative water quality objectives.

To determine whether toxicity exists, recurrent measurements (at least two separate sampling dates) should demonstrate an effect. Appropriate reference and control measures must be included in the toxicity testing. The acceptable methods include those listed in water quality control plans or used by

SWAMP, the Southern California Bight Projects of the Southern California Coastal Water Research Project, U.S. Geological Survey, U.S. Environmental Protection Agency's Environmental Monitoring and Assessment Program, the Regional Monitoring Program of the San Francisco Estuary Institute, and the Bay Protection and Toxic Cleanup Program (BPTCP).

Pollutants should be present in the media at concentrations sufficient to cause or contribute to toxic responses in order to satisfy this condition.

Listing Factor 7: Nuisance

Issue: Many pollutants may be indecent or offensive to the senses. In these cases, the pollutants can cause a nuisance. Many types of data and information can support a finding of nuisance but the primary type is non-numeric information. The SWRCB and RWQCBs receive large amounts of non-numeric information as part of the section 303(d) listing process. These types of information are difficult to interpret in a consistent manner.

Alternatives:

1. Do not use this factor.

2. Use non-numeric data as ancillary information to support numeric lines of evidence.

3. Establish consistent value to trigger listing or specific interpretation guidelines for a finding of nuisance. Develop or use existing interpretation guidelines for qualitative, non-numeric data. Provide guidance on the principles of visual assessments (including photo documentation), a brief description of methods, their applications, and quality assurance practices for reducing error or subjectivity.

4. Determine on a case-by-case basis which non-numeric data should be used in the 303(d) assessments.

Language for Discussion:

Water or sediment exhibits a nuisance (as defined in Water Code Section 13050(m)) measured in the segment. This factor shall be used to translate appropriate narrative water quality objectives and findings of nuisance. Both numeric data and non-numeric data (visual assessments) should be used.

Visual Assessment is a technique to document waterway and watershed conditions and uses. It requires minimal technical equipment or training and relies primarily on the monitor's sensory abilities and common sense. There are two general approaches to visual assessments. The narrative approach involves the use of standardized forms to interpret visual (and other sensory) observations into words or numeric descriptions. There is also a photographic approach. Photographic monitoring, also referred to as "photo documentation," provides a permanent visual documentation of specific waterway and/or watershed conditions. Photographic monitoring may be used as a stand-alone assessment or may accompany a narrative assessment.

Visual assessments are attempts to document conditions from the viewpoint of the individual observer, and are therefore usually qualitative or, at best, semi-quantitative. This assessment can be used as a baseline for gross problem identification, or for tracking gross changes over time. It is assumed that, based on the visual results, a more in-depth monitoring program will be designed to evaluate specific non-point or point source pollution problems.

The following eight parameters can be used in visual assessments: Odor, algae, foam, turbidity, flow, oil, litter or trash, and color.

In addition to visual assessments, numeric data associated with odor, algae, foam, turbidity, flow, oil, litter or trash, and color shall be used to support listing or de-listing sites or water bodies.

Listing Factor 8: Adverse Biological Response

Issue: Adverse effects on aquatic organisms may also be determined for necropsy or for morphological deformities, defects, or other pathological changes in specific tissues or organs. Lesions in these tissues are often correlated with death, deformity, or poor general fitness (condition indices) of animals, and include cancerous or precancerous transformations in tissues such as the gills, liver, reproductive organs, etc. Some abnormalities can, however, appear in the early stages of the development of more damaging pathologies that may be reversible (these are indications of exposure rather than actual adverse effects).

Alternatives:

1. Do not use this factor.

2. Interpret case-by-case.

3. Establish consistent value to trigger listing.
    Options:
    > Use professional judgement of a qualified scientist to interpret data.
    > Use only published reports of adverse biological response.

4. Establish values for association assessment

Language for Discussion:

Adverse biological response as compared to reference conditions measured in the environment is associated with pollutants found in resident individuals or pollution. Endpoints for this factor include reduction in growth, reduction in reproductive capacity, abnormal development, histopathological abnormalities, and other adverse conditions. Evidence that pollutants or pollution are capable of causing or contributing to the adverse condition must be associated with the adverse response. This factor shall be used to translate appropriate narrative water quality objectives.

Growth Measures: Reductions in growth can be addressed using suitable bioassay through measurements of field populations.

Reproductive Measures: Reproductive measures must clearly indicate reductions in viability of eggs or offspring, or reductions in fecundity. Suitable measures include: pollutant concentrations in tissue, sediment, or water which have been demonstrated in laboratory tests to cause reproductive impairment, or significant differences in viability or development of eggs between reference and test sites.

Abnormal Development: Abnormal development can be determined using measures of physical or behavioral disorders or aberrations. Evidence that the disorder can be caused by toxic pollutants, in whole or in part, must be available.

Histopathology: Abnormalities representing distinct adverse effects, such as carcinomas or tissue necrosis, must be evident. Evidence that toxic pollutants are capable of causing or contributing to the disease condition must also be available.

Listing Factor 9: Degradation of Biological Populations or Communities

Issue: The analysis of community composition provides not only a direct assessment of impacts, but also an opportunity to identify indicator species, i.e., species that respond predictably or characteristically in the presence or absence of degraded conditions, such as those produced by a polluted environment. Due to the myriad of forces influencing the composition of a community or population, it is often difficult to determine whether pollution or pollutants are responsible for such changes.

Community structure (organisms that live in the water or sediments) can be used to assess whether sites with substantially similar physical characteristics differ in terms of the species present and numbers of individuals of each species. These types of measures focus on the population or community level. The results can then be analyzed using various indices, ordination techniques, principal component analysis, or other techniques to identify potential causes of any differences detected.

Alternatives:

1. Do not use this factor.

2. Interpret case-by-case.

3. Establish consistent value(s) to trigger listing.
     Options:
          Use professional judgement of qualified scientists to interpret data.
          Express factor in terms of changes in numbers, species diversity, indices of community metrics, etc.
          Identify appropriate reference conditions within watersheds or ecoregion
          Require assessment of before and after impact conditions

4. Establish values for association assessment

Language for Discussion:

Significant degradation in biological populations and/or communities associated with the presence of elevated levels of pollutants or pollution. This factor shall be used to translate appropriate narrative water quality objectives.

This condition requires that the diminished numbers of species or individuals of a single species (when compared to a reference site) are associated with pollution or concentrations of pollutants or pollution. The analysis should rely on measurements from at least two stations. At least one site should not be degraded so that a suitable comparison can be made.

Listing Factor 10: Trends in Water Quality

Issue: Federal regulations require the identification of waters not meeting or are expected not to meet water quality standards. EPA expects states to assess potentially threatened waters and to list waters which are expected to exceed standards during the listing cycle.

Alternatives:

1. Do not use this factor.

2. Interpret case-by-case.

3. Establish consistent value or approach to trigger listing that considers the factors that could influence trends in water quality.
    Options:
    Specify minimum number of sampling periods (days, months, years, etc.) for trends
    Establish specific conditions for using trend analysis
    Specify statistical approaches for evaluating trend data
    Specify methods for considering: Seasonal effects, Interannual effects, changes in monitoring methods, changes in analysis of samples, etc.

4. Use antidegradation analysis to confirm if there are unreasonable impacts on beneficial uses. This alternative could be implemented using a process to classify surface waters of California under the three-tier system used in the Federal antidegradation regulations.

Language for Discussion:

Conditions in any one listing factor shows a trend of declining beneficial use support or water quality standards attainment.

Forming the *California List of Surface Waters Not Meeting Water Quality Standards*, the section 303(d) list, section 305(b) report, and the integrated water quality report

Issue: A key portion of the listing process is deciding how to address water bodies and sites identified as not meeting water quality standards. The SWRCB and RWQCBs must also prepare both the section 303(d) list as well as the section 305(b) report. U.S. EPA has issued guidance (November 19, 2001) to have the States integrate these Clean Water Act requirements into one report.

Alternatives:

1. Place all waters that do not meet standards on the section 303(d) list. Do not use a watch list.

2. Place all waters that do not meet standards on the section 303(d) list and, for those waters with inadequate monitoring data, use a watch list or preliminary list (per the NAS recommendation) that sets priority for monitoring. The consequence of being placed on the watch list would be clearly described.

3. Integrate the section 303(d) and section 305(b) reporting requirements into the development of the *California List of Surface Waters Not Meeting Water Quality Standards* but modify certain aspects of the Guidance. This option we could clearly describe the purpose and need for each portion of the list. For example, a "Monitoring Priority List" could be created that would set State priorities for future monitoring. The categories could be patterned after the proposed categories presented in the U.S. EPA 2002 Integrated Water Quality Monitoring and Assessment Report Guidance except that all waters where water quality standards are not met will be included on the section 303(d) list.

4. Integrate the section 303(d) and section 305(b) reporting requirements into the development of the *California List of Surface Waters Not Meeting Water Quality Standards.* Implement the U.S. EPA guidance. Develop five categories of waters as proposed in the integrated report guidance. Present the consequences of being placed in each category.

5. Develop a multi-part listing process for 303(d) listing purposes and do not integrate with the 305(b) reporting requirements. Under this option we could clearly describe the purpose and need for each portion of the watch list. For example, a "Monitoring Priority List" could be created that would set State priorities for future monitoring. The categories could be patterned after the proposed categories presented in the U.S. EPA 2002 Integrated Water Quality Monitoring and Assessment Report Guidance.

Language for Discussion:

The section 305(b) report provides an assessment of all water bodies and identifies waters where beneficial uses are supported, partially supported, and not supported. The section 303(d) list identifies waters where water quality standards are not met and where Total Maximum Daily Loads are still required.

California's Integrated Water Quality Report shall identify each of the state's waters and describe the water quality of each water body by comparison to the appropriate state water quality standards. In performing this analysis, the integrated report shall be developed using the methodology presented below.

RWQCB Recommendations
The RWQCBs shall develop recommendations for each water body-pollutant/pollution combination for placement in the following categories:

1. Clean Waters List (Category 1): Waters with all beneficial uses met and all water quality standards attained.

2. Probable Clean Waters List (Category 2): Waters with some beneficial uses met and some water quality standards attained, but there is insufficient existing and readily available data and information to determine if the remaining uses and standards are met or threatened.

3. Monitoring Priority List (Category 3): Waters with insufficient existing and readily available data and information to determine if water quality standards are attain or beneficial uses are met.

4. The California List of Surface Waters Not Meeting Water Quality Standards (Category 4 or the section 303(d) list):

    •   TMDL Completed List (Category 4A): Waters where beneficial uses are not attained and water quality standards are not met but TMDL(s) are approved for the water body.
    •   Enforceable Program List (Category 4B): Waters where beneficial uses are not attained or water quality standards are not met but an enforceable program exists that will address the water quality problem in a reasonable time frame.
    •   Pollution List (Category 4C): Waters where beneficial uses are not attained or water quality standards are not met but the problem is not caused by a pollutant.
    •   The TMDL List (Category 4D): Waters where beneficial uses are not attained or water quality standards are not met and the problem is caused by a pollutant or pollutants. A TMDL is necessary to address the problem and is scheduled for completion.

Integrated Report
The SWRCB shall develop California's Integrated Water Quality Report containing the water bodies listed by category. The integrated report shall also contain the schedule for completion of TMDLs, priority ranking, and schedule for priority monitoring.

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For the purposes of section 305(b), the integrated report shall contain:

1. An estimate of the extent that Clean Water Act (CWA) programs have improved water quality or will improve water quality.

2. Recommendations for future actions necessary and identification of waters needing action.

3. An estimate of the environmental, economic, and social costs and benefits needed to achieve the objectives of the CWA and an estimated date of this achievement.

4. A description of the nature and extent of nonpoint source pollution and recommendations for programs needed to control each category of nonpoint sources and the implementation costs.

Priority Ranking for the Water Quality Limited Segments Still Requiring TMDLs

Issue: States are required to set priorities for waters on the section 303(d) list where the development of TMDLs is necessary.

Alternatives:

1. Do not present a TMDL priority setting method and allow each region to establish priorities depending on their needs and the requirements of the Clean Water Act and federal regulation.

2. Use the general TMDL priority setting factors presented in the listing approach used by the RWQCBs and the SWRCB in 1998.

3. Use the general TMDL priority setting factors presented in the listing approach used by the SWRCB in 2002.

4. If the list has multiple parts, establish priorities using general priority setting factors for each part of the list.

5. Do not link priority setting with the schedule for establishing TMDLs.

6. Use a numeric ranking system with each factor weighted appropriately.

Language for Discussion:

For the water bodies on the TMDL list, RWQCB should establish high, medium, and low priority categories based on:

- Water body significance (such as importance and extent of beneficial uses, threatened and endangered species concerns, and size of water body).

- Degree that water quality standards are not met or beneficial uses are not attained or threatened (such as the severity of the pollution or number of pollutants/stressors of concern) (40 CFR 130.7(b)(4)).

- Availability of funding and information to address the water quality problem

- Overall need for an adequate pace of TMDL development for all listed waters over the next two years.

OR

For the water bodies listed on the TMDL List, RWQCB shall establish high, medium, and low priority categories based on:

- Water body significance (such as importance and extent of beneficial uses, threatened and endangered species concerns, and size of water body).

- Degree that water quality standards are not met or beneficial uses are not attained or threatened (such as the severity of the pollution or number of pollutants/stressors of concern) (40 CFR 130.7(b)(4)).

TMDL schedule for the next two-years

Issue: States are required to develop a schedule for completion of TMDLs. Federal regulations require a priority ranking for listed waters to guide TMDL planning for the next two years.

Alternatives:

1. Do not present a schedule setting method and allow each region to establish schedules for establishing TMDLs depending on their needs, priorities, and resource availability.

2. Use the general schedule setting factors presented in the listing approach used by the SWRCB in 2002.

3. Do not link priority setting with the schedule for establishing TMDLs.

4. Establish consistent, specific approach for establishing schedules for establishing TMDLs.

Language for Discussion:

For the water bodies on the TMDL list, RWQCB shall develop a schedule for those waters needing a TMDL using the following categories:

1. Those waters given a high priority are targeted for TMDL completion in the next two years.

2. Medium priority to be addressed within 5 years.

3. Low priorities will be completed in more than 5 years.

OR

For the water bodies on the TMDLs list, RWQCB should develop a schedule for those waters needing a TMDL using the following factors:

•   Availability of funding and information to address the water quality problem

•   Overall need for an adequate pace of TMDL development for all listed waters over the next two years.

Definitions

Issue: Many terms need definition so they are consistently used.

Some terms and potential sources of a definition are:

- Pollutant—CWA, Porter-Cologne
- Pollution—CWA, Porter-Cologne
- Contaminant—Porter-Cologne
- Exotic/Invasive Species—Public Resources Code
- Controllable sources—Basin Plans
- Uncontrollable sources
- Natural source of pollution/pollutant
- Water quality standards—CWA, federal regulation
- Beneficial use—Porter-Cologne
- Water body
- Reach
- Water quality limited segment—Federal regulation
- Alternate enforceable program (and examples)
- Nuisance—Porter-Cologne
- Impairment, Impaired