Copy of Administrative Record
In support of

Clean Water Act Section 303(d) List of Impaired Waters, 2002 Update

Part 2

As of November 6, 2001

California Regional Water Quality Control Board, San Diego Region

Polluted waters listed

53 sites in region are nominated; more widespread testing accounts for 47 percent increase, experts say

By Terry Rodgers
UNION-TRIBUNE STAFF WRITER

November 6, 2001

With million-dollar homes perched on a scenic coastal bluff, Pacific Beach Point looks as pristine as a postcard issued by the Chamber of Commerce.

But 27-year-old Jade Tindle, a surfer who's in the water every day, knows there is an unsavory secret lurking in the sea at the place locals refer to as "P.B. Point."

"The first couple of years I surfed there, I got extremely sick. A couple of times I almost went to the hospital," said Tindle, who can't stay away because the waves at the point are too perfect.

Bacteria from an unknown source are contaminating the water at Pacific Beach Point, which marks the southern boundary of La Jolla.

The popular surfing spot is among the most chronically polluted beaches in San Diego, and one of 53 sites in the region nominated for a statewide list of "impaired" water bodies.

The list was last updated in 1998, when 36 beaches, streams, lagoons and lakes in the region were deemed impaired because the water was no longer suitable for swimming or fishing, or was harming wildlife.

"What it boils down to is that (it) becomes our list of priorities for cleaning up contaminated water bodies," said Deborah Jayne, a water-quality expert for the state.

While the new list represents a 47 percent increase, experts say it's the result of better information from more widespread water testing, rather than a dramatic rise in pollution.

"The list helps us face the truth about the kind of job we're doing," said Laura Hunter of the Environmental Health Coalition. "It helps us prioritize what areas will get the extra help they need."

The list of nominations was compiled by scientists with the San Diego Regional Water Quality Control Board, a state agency charged with enforcing the federal Clean Water Act. It oversees water quality from the mountains to the sea, including 85 miles of coastline from Laguna Beach in Orange County to the U.S.-Mexico border.

"Most pollution you can't see," Hunter said. "When it's rainy, you will see a lot of foam. But most of the chemicals and toxins in our water are not visible."

Bodies of water on the list are given a low, medium or high priority. The worst-polluted water bodies are subject to enforcement action by the regional board, which will develop a plan to reduce the pollutants.

"Cities with sites listed for immediate action will have to actively participate in reducing pollution," said Ruth Kolb, a storm-water pollution expert for the city of San Diego.

More beaches made the list than any other category of water body because the coastline is more closely monitored than rivers or streams. A state law passed in 1998 mandated increased testing for bacteria contamination from May through October.

Hunter said the Environmental Health Coalition wants the list expanded to include the Southern portion of San Diego Bay, which is affected by hot water and chlorine from the South Bay power plant, and areas around North Island Naval Air Station affected by oil spills.

Not everyone likes the way the list was put together.

The Southern California Alliance of Publicly Owned Treatment Works, which represents sewer agencies, has complained that the listing process is flawed. They're afraid the burden for cleaning up the polluted waters will fall on their shoulders.

The sewer agencies "are looking for consistency," said Mary Jane Foley, a consultant for the alliance. "Science and public policy must always intersect."

The list includes urban and rural polluted bodies of water. "Pollution is a very equal opportunity agent," said Bruce Reznik, executive director for San Diego Baykeeper.

Chollas Creek, a seasonal stream that drains a highly urbanized area of southeast San Diego, is listed as impaired because of heavy metals and high bacteria. Auto body and repair shops and industrial sites may be at fault.

Lake Hodges, a suburban reservoir that is an emergency drinking-water source for San Diego, made the list because the water is high in phosphorus, which comes from fertilizers, as well as nitrogen-based nutrients and salt and other minerals that are dissolved in the water.

Reznik said the next step is for the government to begin identifying the sources of contamination so they can eventually be eliminated.

"The reality is our waters have been this bad for a while, and the list is a recognition of that," he said. "My gut feeling is that it's still probably a drastic undercounting of our polluted water in San Diego."

Regional board officials acknowledge the list isn't definitive.

"We don't have enough data to do a proper assessment of all our water bodies," said Jimmy Smith, an environmental scientist with the regional board.

Communities near a body of water on the impaired list should first take notice, then take action, Smith said. "I would talk to your city officials, find out what's going down your storm drains and go out and get involved."

The state's nine regional boards used to control their own lists, but that power has been transferred to the state Water Resources Control Board in Sacramento.

The San Diego board will hold a workshop Dec. 5 to hear public comments on changes to the list. Later this winter, the Water Resources Control Board will finalize the statewide list, which three years ago included 509 bodies of water.

The San Diego regional board has jurisdiction over 3,900 square miles of watershed encompassing southwest Orange County, southwestern Riverside County and the portion of San Diego County west of the Laguna Mountains.

California Regional Water Quality Control Board
San Diego Region

Winston H. Hickox
Secretary for Environmental Protection

Internet Address: http://www.swrcb.ca.gov/rwqcb9/
9174 Sky Park Court, Suite 100, San Diego, California 92123
Phone (858) 467-2952 • FAX (858) 571-6972

Gray Davis
Governor

DATE: November 5, 2001

TO: Interested Parties

SUBJECT: *** PUBLIC WORKSHOP RESCHEDULED ***
Draft Clean Water Act Section 303(d) List of Impaired Water, 2002 Update

Public Workshop Rescheduled
The public workshop tentatively scheduled for November 29, 2001 has been rescheduled for **Wednesday, December 5, 2001.** The public workshop will begin at 0900 at the office of the California Regional Water Quality Control Board, San Diego Region (Regional Board, 9174 Sky Park Court, Suite 100). The workshop will provide information on the process involved in creation of the Section 303(d) list, the waterbodies and pollutants listed and give the public a chance to comment. All public comments must be written and comply with the attached form.

Local Informal Public Process
Two public review and comment processes will be conducted to receive input on the draft list. An informal process will be conducted locally, and a formal public process will be conducted in Sacramento.

The informal local public process began on October 24 with the release and posting of the draft list. Also on October 24 the draft list was presented to Regional Board members as an informational item only. The draft list was not approved by the Regional Board or it's members. The draft list was forwarded to the State Board on October 31, 2001. On December 5, 2001 the Regional Board will conduct an informal local public workshop on the draft list.

On a regional level, public comments will be accepted and considered. If significant changes result from public comments and from the public workshop, the draft list will be revised, the changes sent to the State Board and a second presentation will be made at an upcoming Regional Board Meeting. Changes and updates can continue to be made and forwarded to the State Water Resources Control Board (State Board) through the State Board's formal review period.

Formal Public Process
This coming winter, the State Board will be addressing public comments and conducting a public workshop(s). In early spring, the State Board will conduct a formal hearing(s) to consider adopting the single statewide Clean Water Act Section 303(d) list of impaired waters. The adopted list will be submitted to USEPA in the form of the State's biennial report on water quality.

Availability of draft Section 303(d) List
On behalf of the (State Board), the (Regional Board) has posted the draft Clean Water Act Section 303(d) list of Impaired Waters on its website: (http://www.swrcb.ca.gov/rwqcb9/). Hardcopy versions of the list are also available at the office of the Regional Board.

Any questions or concerns can be directed to Mr. Jimmy Smith of the Regional Board at (858) 467-2732 or by email at 303dlist@rb9.swrcb.ca.gov. The Regional Board looks forward to your participation in this vital process.

Respectfully,

JOHN H. ROBERTUS
Executive Officer
San Diego Regional Water Quality Control Board

Clean Water Act Section 303(d) List of Impaired Waters, 2002 Update
Public Comments, Questions and Concerns

The update of the Clean Water Act Section 303(d) List of Impaired Waterbodies is being developed by the State Water Resources Control Board (State Board) as a single, statewide list for submittal to the United States Environmental Protection Agency (USEPA). An informal public workshop will be conducted by the California Regional Water Quality Control Board, San Diego Region (Regional Board) on **December 5, 2001** at the office of the Regional Board (9174 Sky Park Court, Suite 100, San Diego, 92123). Informal public comments can be submitted using this form. Comments received before November 28, 2001 will be given priority ranking when answering questions at the workshop.

State Board will be formulating a single, statewide list of impaired waters. State Board will be conducting the formal public review and comment period, providing written responses to all comments, conducting public workshop(s), conducting the formal public hearing and adopting the formal statewide list.

Regional Board has solicited information, reviewed all readily available data and produced a draft list of additions and changes to the Section 303(d) list of impaired waters. This list and supporting documents can be viewed at the Regional Board website (www.swrcb.ca.gov/rwqcb9/Programs/TMDL/303d/303d.html) or at the office. Public comments can be addressed to the Regional Board, but it will be the State Board that formally responds. Every effort will be made to address all comments at the Public Workshop. All public comments should adhere to the form below.

Name: ______________________________ **Phone #**________________

Address: ____

E-mail: ____

Topic of Concern: __________________________ **Staff Report pg #**______

Questions / Concerns *Only written* comments will be addressed at the workshop. All comments must be specific to the overall process of Section 303(d) list creation, the Regional Board role, the State Board role, a listed waterbody or pollutant or to a waterbody or pollutant that is not listed. ____

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From: 303dlist
To: RZAINO@ci.santee.ca.us
Date: Tue, Oct 30, 2001 4:52 PM
Subject: Re: 303d list

Mr. Zaino,
I received your phone message yesterday and this email today. The email seemed to have no content, so I will only address your phone message. If there are more concerns, please reply or call.

The 303d listing of the lower SD river is recommended for 5 constituents. The extent of impairment is specific for each constituent. For chlordane, it is ½ mile up and ½ mile dowstream of Taylor Street. For low dissolved oxygen, it is the lower portion of the river - all 20 miles. This extends from approximately Lakeside to the ocean. For fecal coliform, the extent of impairment is from Fashion Valley Rd to the ocean - approx. the lower 6 miles. The extent of impairment for Phosphorus is the same as for dissolved oxygen. For TDS, it is the area between Old Mission Dam to Fashion Valley Road - approximately 15 miles.

I hope this helps clarify the issue.

I also invite you to an informal Public Workshop on 303d issues to be held on Nov 29, 2001 at 0900 here in Kearny Mesa. I hope you can attend. Check our website for details - address below.

Also, an updated 303d report will be available on our website by the end of the week.

-jimmy

>>> "Robert Zaino" <RZAINO@ci.santee.ca.us> 10/29/01 05:06PM >>>

From: Bruce Charest <bcharest@nassco.com>
To: <303dlist@rb9.swrcb.ca.gov>
Date: Fri, Oct 26, 2001 3:54 PM
Subject: 303(d) List Letter

Hello:
I had a question about the above dated October 23, 2001 addressed to Interested Parties. In the Background section the letter states that "The State's most recent Secton 303(d) list was approved in 1998 and contains 509 waterbodies, many listed for multiple pollutants. The Regional Board placed 36 water bodies on the 1998 list, with a total of 69 water body/pollutant combinations." So are the 36 water bodies included in the 509 and other parties placed 473 or were the 36 and addition to the 509?
Thanks
Bruce Charest

303d Presentation at Board Meeting – The Aftermath **25 Oct 01**

Comments from Laurie Black

- Need to inform the public of significance and implications of 303d listed waters. Suggests Robertus write an Op-Ed piece for the local papers – perhaps the editors could be a 3rd party advocate

Comments from Wayne Baglin

- Data is available that shows poor water quality (due to bacteria) for Laguna Lakes from the County of Orange. There are 3 lakes at this location, and #3 is the one most often impaired. This drains to Laguna Creek and empties at Laguna Beach.
- Remove "mouth of orange" from pg 24 for Aliso Creek.
- The listing of Dana Point Harbor for dissolved copper comes as a "big surprise to everyone." Major renovation projects are in the works that would intensify the use of the harbor. BMPs need to be in place. Be sure to inform the Co of Orange about this listing.
- Check the listing of Doheny Beach – should it really be Laguna Beach? Pg 29
- Check the listing of Aliso Beach vs Capistrano Bay District. He thinks its Aliso Beach.
- Concerned about the Potential Rec 1 beneficial use. Feels it is difficult to clarify and to enforce. We need to re-evaluate this designation. Feels would should dump the potential and designate the waters as either Rec 1 or Rec 2.
- Concerned about the 1998 listing of Emerald Bay, which is in a privately owned part of town. We need to re-evaluate this listing and notify the district that it is listed.
- Check 98 listing – extent of impairment for Laguna Beach and Aliso Beach.

Comments from Jack Minan

- Concerned that there is no uniformity in standards needed to list a waterbody.
- Concerned that there is no consistency in the monitoring dates of listed waterbodies. There is no coherent strategy for sampling.

Both concerns addressed by Smith. Minan seemed to be satisfied with the answer.

Comments from Mary Jane Forrester Foley

- Concerned mainly with the process, and not the list itself

- Consultant to SCAP and read their letter.
- SCAP wants to make sure that the TMDL burden is shared with non-point source stake holders.
- She cannot attend the Nov. 29th workshop
- Likes the Watch vs Action list as put forth in the NRC report (part of NAS) on TMDLs. Feels it could be useful for prioritizing TMDLs.
- Feels local dischargers (and environmental groups) do not have the funds to attend hearings in Sacramento and hopes the State Board will conduct regional hearings.
- Would like to hammer out the issue of "Acceptance of Assessment" before discussing the list itself
- Concerned over the lack of QA / QC requirements and standards.
- Stakeholders and interested parties have limited comment time.
- If fish can live and adapt to polluted waters, than maybe this kind of bio criteria is more applicable than water quality chemistry concentrations.
- Eliminate vague criteria! Criteria should be relevant to watershed characteristics
- Need for consistency among Regional Boards!
- LA is amending their Basin Plan in regards to REC 1
- Recommends a "tiered approach" as outlined in the 1986 EPA document for bacterial standards that takes into account "frequently used" vs "infrequently used beaches."
- Letter outlining the above sent to Robertus.

Craig Elliot, Speaking for David Loyd

- Resident of area near Agua Hedionda Lagoon
- On the Caleurpa action team
- Should add Caleurpa to the 303d list
- Look at the National Invasive Species Management Plan by EPA as it lists Caleurpa as a non-point source pollutant
- David Loyd works for the Encino Power Plant and also support listing.

Keith Pezzoli and Michael Bedar

- UCSD Urban Studies and Planning and the San Diego Super COmputer

- Want to help in TMDL process
- Has an integrated GIS database for the transborder area
- Wants to develop a web environment for public access
- Has in-house funds available = $100k!! with Steve Miller to develop a system for the distribution of environmental information
- Check out the Cal IT^2 Project that hopes to develop a wireless, real time data access web portal (Larry Smar? = head of this project)
- Lengthy discussion took place after presentation. He will e-mail a project proposal for the internal funds that he hopes will ganar Regional Board support. Also discussed them giving a presentation to Regional Board staff or a visit to UCSD to check out their project
- Has excellent maps of watersheds, topography, storm drains, etc…!!!

Comment from John Robertus

- Be sure to cross and double check agreement between HSA # and waterbody name.

STATE OF CALIFORNIA
REGIONAL WATER QUALITY CONTROL BOARD
SAN DIEGO REGION

SPECIAL BOARD MEETING

AGENDA

Wednesday, October 24, 2001
9:00 a.m.

Regional Water Quality Control Board *9174 Sky Park Court, Suite 100* *San Diego, California*

The Regional Board requests that all lengthy comments be submitted in writing in advance of the meeting date. To ensure that the Regional Board has the opportunity to fully study and consider written material, comments should be received in the Regional Board's office no later than 5:00 P.M. on Wednesday, October 10, 2001, and should indicate the agenda item to which it is applicable. If the submitted written material is more than 5 pages or contains foldouts, color graphics, maps, etc., 20 copies must be submitted for distribution to the Regional Board members and staff. Written material submitted after 5:00 P.M. on Wednesday, October 17, 2001 will not be provided to the Regional Board members and will not be considered by the Regional Board.

Comments on agenda items will be accepted by E-mail subject to the same conditions set forth for other written submissions as long as the total submittal (including attachments) does not exceed five printed pages in length. E-mail should be submitted to: rbagenda@rb9.swrcb.ca.gov.

Pursuant to Title 23, California Code of Regulations, Section 648.2, the Regional Board may refuse to admit written testimony into evidence if it is not submitted to the Regional Board in a timely manner, unless the proponent can demonstrate why he or she was unable to submit the material on time or that compliance with the deadline would create an unreasonable hardship.

NOTE C, attached to this Notice, contains a description of the hearing procedures that will be followed by the Regional Board. Hearings before the Regional Board are normally conducted using procedures that do not include cross-examination. Parties requesting use of more formal procedures must do so in accord with the directions in NOTE C. Any such request, together with supporting material, must be received in the Regional Board's office no later than 5:00 P.M. on Wednesday, October 10, 2001.

11. Arrangements for Next Meeting and Adjournment
Wednesday, November 14, 2001- 9:00 a.m.
City of Laguna Niguel
City Hall Council Chambers
27801 La Paz Road
Laguna Niguel, California

Notifications

A. Public notification of Regional Board staff's and Executive Officer's concurrence with the environmental regulatory closure of former leaking underground storage tanks 1828 and 1832 located at Naval Computer and Telecommunications Station, Imperial Beach, California. *(Charles Cheng)*

B. Public notification of Regional Board staff's and Executive Officer's concurrence with the environmental regulatory closure of former leaking underground storage tanks 981, 982 and 1005 located at Naval Air Station North Island, San Diego, California. *(Charles Cheng)*

C. Public notification of Regional Board staff's and Executive Officer's concurrence with the closure of fuel line release Site #67 at Fleet Industrial Supply Center, San Diego, California. *(Laurie Walsh)* the use of an informal procedure, in accord with the directions below, will constitute consent to the informal hearing (See Title 23, California Code of Regulations, Section 648.7). Even with a timely objection, an informal procedure may be used under the circumstances identified in Government Code § 11445.20 (a) (b) or (d).

For formal hearings, designated parties must submit witness testimony prior to the hearing date. During the formal hearing, witnesses will be allowed a limited time to orally summarize the pertinent points of their testimony. Designated parties requesting a formal hearing must submit 20 copies of the following information to the Regional Board. This information must be received in the Regional Board's Office by the date indicated on the first page of this Agenda Notice for the submission of a request for formal hearing:

- Witness testimony;
- The name of each proposed witness and the order in which witnesses will be called;
- A description/summary of what each witness' testimony is intended to prove; and,
- Identification of material factual issues in the dispute.

When a hearing is conducted using formal procedures, participants will be determined to be either "designated parties" or other "interested persons". Only designated parties will have the right to cross-examine witnesses. Interested persons do not have a right to cross-examination, but may ask the Regional Board to clarify testimony.

Designated parties automatically include the Regional Board and any person to whom an order is addressed (i.e., the Discharger(s)). All other persons wishing to testify or provide comments at a formal hearing are interested persons. An interested person may request status as a designated party for purposes of the formal hearing. A request must be received in the Regional Board's Office by the date indicated on the first page of this Agenda Notice for the submission of a request for formal hearing. The request must explain the basis for status as a designated party and, in particular, how the person is directly affected by the possible actions of the Regional Board.

For any hearing (formal or informal) the Chair will allocate time for each party to present testimony and comments and to question other parties if appropriate. Interested parties will generally be given 3 minutes for their comments. Where speakers can be grouped by affiliation or interest, such groups will be asked to select a spokesperson. The Chair may allocate additional time for rebuttal or for a closing statement. Time may be limited due to the number of persons wishing to speak on an item, or the number of items on the Board's agenda, or for other reasons.

All persons testifying must state their name, address, affiliation, and whether they have taken the oath before testifying. The order of testimony for hearings generally will be as follows, unless modified by the Regional Board Chair:

- Testimony* of Regional Board staff
- Testimony* of discharger
- Testimony* of other designated parties
- Testimony* of interested persons
- Closing statement by designated parties other than discharger

Details concerning other agenda items are available for public reference during normal working hours at the Regional Board's office. The appropriate staff contact person, indicated with the specific agenda item, can answer questions and provide additional information. For additional information about the Board, please see the attached sheet.

G. PETITION OF REGIONAL BOARD ACTION

Any person affected adversely by a decision of the California Regional Water Quality Control Board, San Diego Region (Regional Board) may petition the State Water Resources Control Board (State Board) to review the decision. The petition must be received by the State Board within 30 days of the Regional Board's meeting at which the adverse action was taken. Copies of the law and regulations applicable to filing petitions will be provided upon request.

NOTE: If the State Board accepts a petition for review, the Regional Board will be required to file the record in the matter with the State Board. The costs of preparing and filing the record are the responsibility of the person(s) submitting the petition. The Regional Board will contact the person(s) submitting a petition and inform them of the payment process and any amounts due.

H. HEARING RECORD

Material presented to the Board as part of testimony (e.g. photographs, slides, charts, diagrams etc.) that is to be made part of the record must be left with the Board. Photographs or slides of large exhibits are acceptable.

All Board files, exhibits, and agenda material pertaining to items on this agenda are hereby made a part of the record.

I. ACCESSIBILITY

The facility is accessible to people with disabilities. Individuals who require special accommodations are requested to contact Ms. Lori Costa at (858) 467-2357 at least 5 working days prior to the meeting. TTY users may contact the California Relay Service at 1-800-735-2929 or voice line at 1-800-735-2922.

CALIFORNIA REGIC AL WATER QUALITY CONTR BOARD
SAN DIEGO REGION

·174 Sky Park Court, Suite 100
an Diego, California 92123

Information: (858) 467-2952
CALNET: (8) 734-2952

BOARD MEMBERS	CITY OF RESIDENCE	APPOINTMENT CATEGORY
John Minan - Chair	San Diego	Water Quality
Gary Stephany - Vice Chair	San Diego	Undesignated (Public)
Wayne Baglin	Laguna Beach	Municipal Government
Laurie Black	San Diego	Water Quality
Janet Keller	Laguna Beach	Recreation/Wildlife
Terese Ghio	Poway	Industrial Water Use
Vacant		Water Supply
Vacant		County Government
Vacant		Irrigated Agriculture

xecutive Staff
ohn H. Robertus, *Executive Officer*
rthur L. Coe, *Assistant Executive Officer*
ori Costa, *Executive Assistant*

tate Board Staff Counsel
ohn Richards

tate Board Member Liaison
eter Silva

VATERSHED BRANCH
lichael McCann, *Supervising Engineer*

Vatershed Protection Northern Region
obert Morris, *Sr. Water Resource Control Engineer*
tacey Baczkowski, *Environmental Specialist III*
avid Gibson, *Environmental Specialist III*
eremy Haas, *Environmental Specialist II*
hristopher Means, *Environmental Specialist I*
ric Becker, *Water Resource Control Engineer*
rennan Ott, *Water Resource Control Engineer*

Vatershed Protection Southern Region
lark Alpert, *Senior Engineering Geologist*
ristin Schwall, *Assoc. Water Resource Control Engr*
)at Quach, *Associate Water Resource Control Engr*
hil Hammer, *Environmental Specialist III*
lichael Porter, *Environmental Specialist III*
lo Lahsaie, *Environmental Specialist III*
ane Ledford, *Environmental Specialist II*
)eborah Woodward, *Environmental Specialist II*

ompliance Assurance
/acant, *Senior Water Resource Control Engineer*
rank Melbourn, *Assoc Water Resource Control Engr*
/icente Rodriguez, *Water Resource Control Engineer*
anya Bilezikjian, *Water Resource Control Engineer*
ebecca Stewart, *Sanitary Engineering Associate*

Publicly Owned Treatment Works Compliance
Brian Kelley, *Senior WRC Engineer*
Chiara Clemente, *Environmental Specialist III*
Victor Vasquez, *Water Resource Control Engineer*
Adam Laputz, *Water Resource Control Engineer*
David Hanson, *Water Resource Control Engineer*
Bryan Ott, *Water Resource Control Engineer*
Robert Baker, *Retired Annuitant*

Industrial Compliance
John Phillips, *Senior WRC Engineer*
Paul Richter, *Associate Water Resource Control Engr*
Hashim Navrozali, *Water Resource Control Engineer*
Chehreh Komeylyan, *Water Resource Control Engr.*
Sabine Knedlik, *Water Resource Control Engr.*
Whitney Ghoram, *Sanitary Engineering Associate*
Gloria Fulton, *Sanitary Engineering Associate*
Don Perrin, *Retired Annuitant*

Marine Waters
Peter Michael, *Environmental Specialist IV*

Inland Surface Waters
Greig Peters, *Environmental Specialist IV*

Watershed Management Coordinator
Bruce Posthumus, *Senior WRC Engineer*

WATER RESOURCE PROTECTION BRANCH
David Barker, *Supervising Engineer*

Land Discharge Unit
John Odermatt, *Senior Engineering Geologist*
Carol Tamaki, *Assoc. Water Resource Control Engr*
Brian McDaniel, *Associate Engineering Geologist*
Craig Carlisle, *Associate Engineering Geologist*
Amy Fortin, *Engineering Geologist*

SUPPLEMENTAL
EXECUTIVE OFFICER SUMMARY REPORT
October 24, 2001

ITEM:	10
SUBJECT:	**Status Report: Clean Water Act Section 303(d) List of Impaired Waters – 2002 Update. (James Smith)**
PURPOSE:	To present the draft Section 303(d) list, which will be submitted to the SWRCB on October 31st, 2001. This is an informational item. No Board action is required.
DISCUSSION:	See previous Executive Officer Summary Report
LEGAL CONCERNS:	None
SUPPORTING DOCUMENTS:	Staff Report containing draft Clean Water Act Section 303(d) List of Impaired Waters – 2002 update, and all supporting documents.
RECOMMENDATIONS:	Receive and file.

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State of California
Regional Water Quality Control Board
San Diego Region

EXECUTIVE OFFICER SUMMARY REPORT
October 24, 2001

ITEM: 10

SUBJECT: **Status Report: Clean Water Act Section 303(d) List of Impaired Waters – 2002 Update. (James Smith)**

PURPOSE: To present the draft Section 303(d) list, which will be submitted to the SWRCB on October 31st, 2001. This is an informational item. No Board action is required.

DISCUSSION: The Section 303(d) list update process is being coordinated by the State Water Resources Control Board (State Board) as a single, statewide list update for submittal to the United States Environmental Protection Agency (USEPA). Staff conducted the public solicitation for new information, reviewed all readily available data and proposed additions and changes to the existing 1998 Section 303(d) List of Impaired Waterbodies.

The revised draft Clean Water Act Section 303(d) List of Impaired Waters, 2002 Update will be presented to Board Members and the public at the October 24th Regional Board Meeting. The draft list update will soon be available for public review and will also be presented at an informational public workshop, approximately 30 days after it is made available. The complete schedule is detailed below.

<u>Background</u>
Section 303(d) of the federal Clean Water Act (CWA, 33 USC 1250, *et seq.*, at 1313(d)), requires States to identify waters that do not meet water quality standards after applying certain required technology-based limits (i.e. "impaired" water bodies). States are required to compile this information and submit it to USEPA for review and approval. This list is commonly known as the Section 303(d) list of impaired waters. Once listed, the Regional Board is mandated to prioritize each waterbody / watershed for subsequent development of total maximum daily loads (TMDLs). The purpose of a TMDL is to ensure that beneficial uses are restored and water quality standards are achieved. The State Board and Regional Boards have ongoing efforts to monitor and assess water quality, to prepare the Section 303(d) list and to develop the required TMDLs. The State's most recent Section 303(d) list was approved in 1998 and contains 509 waterbodies, many listed as being impaired for multiple pollutants. The Regional Board placed 36 water bodies on the 1998 list, with a total of 69 water body / pollutant combinations.

Role of Regional Board in Public Process

On behalf of the State Board, the Regional Board solicited data and information regarding water quality conditions of surface waters. Solicitation letters were sent out to the Regional Board Agenda mailing list and newspaper notices were posted on March 7, 2001. At the same time, a Section 303(d) List of Impaired Waterbodies 2002 Update information page was added to the Regional Board's website. Two public workshops were held (April 4, 2001 and May 3, 2001) to give an informational overview of the Section 303(d) listing process, solicit information and to provide the opportunity for public comments, questions and concerns to be expressed and addressed. The solicitation period closed on May 15, 2001 and resulted in 60 unique sets of data and information submitted to the Regional Board for review and analysis.

The Regional Board has finished analysis and critical review of all submitted data and information and created an initial draft list of additions and modifications to the existing Section 303(d) list of impaired waterbodies. The draft list is currently undergoing internal review and is subject to change. The draft update recommends the addition of 18 new waterbodies to the Section 303(d) list. Also recommended is the addition of 4 new pollutants to previously listed waterbodies and changes in the extent of impairment for 17 previously listed waterbodies. No de-listings are recommended. Previously listed waterbodies were only re-evaluated if new data / information was available.

The draft Clean Water Act Section 303(d) List of Impaired Waters, 2002 Update will be presented at the October 24, 2001 Regional Board meeting as a status report / informational item that will require no formal Board action. The draft list will be submitted to the State Board on October 31, 2001.

The Draft Clean Water Act Section 303(d) List of Impaired Waters, 2002 Update should be posted on the Regional Board's website at the end of the week of October 15, 2001. Concurrently, a notice of the list's availability on the web (and at the office) will be mailed and will include information regarding a public workshop tentatively scheduled for 30 days after the list's release for public review. The workshop will provide information on the process involved in creation of the Section 303(d) List, the waterbodies and pollutants listed and give the public a chance to comment on the draft list. On a regional level, public comments will be accepted and considered. If significant changes result from public comments and from the public workshop, the draft list will be revised, the changes sent to the SWRCB and a second presentation will be made at an upcoming Regional Board Meeting. Changes and updates can continue to be made and forwarded to the SWRCB through the formal review period held this winter.

Projected Schedule

In summary, the sequence of events will be as follows:

End of the week of October 15th, 2001 - Draft list and Staff Report made available to public.

October 24th, 2001 – Draft list presented to Regional Board.

October 31st, 2001 – Draft list submitted to SWRCB.

End of the week of October 15th, 2001 until Public Workshop – Public review of draft list and Staff Report.

Late November – Public Workshop conducted.

Staff will review and consider public comments and may modify the 303(d) list of impaired waters as appropriate. If changes are made, the draft list will be revised, the changes sent to the SWRCB and a second presentation will be made at an upcoming Regional Board Meeting.

Role of State Board in Public Process

The State Board will formulate a single, statewide draft Section 303(d) list based on the recommended draft list received from each Regional Board. This coming winter, the State Board will conduct a full formal public review and comment period, develop written responses to comments, conduct public workshop(s) and conduct a public hearing(s) at which the State Board will consider adoption of the draft statewide 303(d) list. The statewide list will then be submitted to the USEPA in the form of the State's biennial report on water quality. This information will in turn be submitted by USEPA to Congress pursuant to Section 305 of the Clean Water Act (33USC 1315).

LEGAL CONCERNS: None

SUPPORTING DOCUMENTS: All supporting documents will be mailed with the late agenda package on Friday, October 19th. This will include the Staff Report, which will contain the draft list update to the Clean Water Act Section 303(d) list of impaired waters.

RECOMMENDATIONS: Receive and file.

H:\WQS\303dlist\EOSR and EOR

Agenda Notice

Agenda Item (October 24, 2001 Board Meeting)

Status Report: Clean Water Act Section 303(d) List of Impaired Waters – 2002 Update (James Smith).
This is an informational item. No Board action is required. Presentation of the draft list is to be submitted to the SWRCB on Oct 31.

State Water Resources Control Board

Division of Water Quality
1001 I Street • Sacramento, California 95814 • (916) 341-5455
Mailing Address: P.O. Box 100 • Sacramento, California • 95812-0100
FAX (916) 341-5463 • Internet Address: http://www.swrcb.ca.gov

Winston H. Hickox
Secretary for Environmental Protection

Gray Davis
Governor

TO: Val Connor

CC: Tim Stevens, Craig J. Wilson, Deborah Jayne

FROM: Diane Beaulaurier

DATE: Oct 24, 2001

SUBJECT: Region 9 2002 303(d) list status

The following information is a transmittal of my telephone conversation of Monday, October 22, 2001 with Deborah Jayne of the San Diego Regional Water Quality Control Board, regarding the current status of their 2002 303(d) listing process.

1. Staff will present their draft list to their Board on Wednesday, October 24. A public comment period will follow the workshop. The length of comment period was uncertain at the time of our conversation. Their attorney advised 30 days, however that will significantly impinge on SWRCB's schedule, so they are trying instead for a 2-week comment period, since there is not a formal adoption at the Regional level.

2. Although Region 9 had planned to conduct a public workshop prior to the Board meeting, they were unable to do so. They will hold one sometime after October 31.

3. They will respond to verbal comments at the workshop, that will be transcribed by a court reporter. A copy of the transcript will be sent to us, along with any written comments that are received.

4. I was told that I would receive their preliminary (pre-draft) list via email on Monday, however I have not yet received it as of today.

5. Summary of list changes:

   24 new waters
   15 new pollutants added to existing listed waters
   1 change of extent
   0 delistings

6. Used weight of evidence approach.

C. Arias

Conversation w/ Clay Clifton (SD County, Dept. Env. Health) 10/17/01

The term "Beach Closure" specifically refers to a sewage spill (as opposed to other means of bacterial contamination). Signs are posted after a known spill, and sampling is done the next day. The beach stays closed until 2 consecutive days of sampling show that bacterial levels are within State standards (Dept. of Health Services)

Permanent beach postings (warning signs) were initially done in 1997 but with no guidance from the State. Postings were updated in 2001, (yellow & black bordered) and were done in a manner to mimic AB411 (Wayne Bill) protocol (located at areas with dry weather flow, high usage). Exact interpretation of guidance (Guidance to salt water beaches, DHS 2000) left to discretion of individual Depts. of Environmental Health (text reads "chronically contaminated"). County of San Diego adopted AB411 protocol to satisfy guidance outlined by DHS. Letter sent in April, 2001 to coastal cities requesting posting of storm drains and creek outlets at specified locations.

County of SD samples at location 25 yards downstream of storm drain / creek outlet. "Chronically contaminated" always describes dry weather flow. Sampling at "point zero" will always yield exceedances, sampling 25 yards away will not always show exceedances. If sampling shows exceedances in any ONE of four standards (DHS, 2000), health advisory sign is placed until bacterial levels drop. Also, items such as sand excavations trigger advisory postings automatically.

Implementation regulations for AB411—see CCR Title 17, Section 7956.

State Water Resources Control Board

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Winston H. Hickox
Secretary for Environmental Protection

Gray Davis
Governor

To File

The energy challenge facing California is real. Every Californian needs to take immediate action to reduce energy consumption. For a list of simple ways you can reduce demand and cut your energy costs, see our website at http://www.swrcb.ca.gov.

TO: Regional Board Executive Officers

FROM: Stan Martinson, Chief
DIVISION OF WATER QUALITY

DATE: October 4, 2001

SUBJECT: DUE DATES FOR 303(d) AND 305(b) REPORTING

The Regional Boards are requested to provide all remaining available information needed by the SWRCB-DWQ, in order to comply with federally mandated due dates for the 303(d) and 305(b) Reports. For 303(d), the specific items needed are listed in the *Regional Board 303(d) List Submittal Package* (see attachment). Because no Regions have conducted Board meetings related to final 303(d) list recommendation, DWQ recognizes that the final lists are not yet available. DWQ will begin its staff report using the draft lists. For 305(b), the GeoWBS data files (the Geowbs.mdb and the zipped Geodata files) are needed. All available 303(d) and 305(b) information is needed **no later than** October 15, 2001. Attached is a table showing information received by DWQ to date, and information still needed. Thank you for your assistance with this request. If you have any questions regarding 303(d), please contact Diane Beaulaurier at (916) 341-5549. For questions on 305(b) please contact Adam Morrill at (916) 341-5548.

Attachments: Regional Board 303(d) List Submittal Package
303(d) Information Summary Table

cc: Matt St. John, North Coast RWQCB
Bruce Gwynne, North Coast RWQCB
Steve Moore, San Francisco Bay RWQCB
Jeff Kapellas, San Francisco Bay RWQCB
Angela Carpenter, Central Coast RWQCB
Karen Worcester, Central Coast RWQCB
Rene DeShazo, Los Angeles RWQCB
Joe Karkoski, Central Valley RWQCB
Gene Davis, Central Valley RWQCB
Judith Unsicker, Lahontan RWQCB
Doug Wylie, Colorado River Basin RWQCB
Teresa Newkirk, Colorado River Basin RWQCB
Pavlova Vitale, Santa Ana RWQCB
James Smith, San Diego RWQCB

Adam Morrill, SWRCB-DWQ
Diane Beaulaurier, SWRCB-DWQ
Val Connor, SWRCB-DWQ

Regional Board 303(D) List Submittal Package:

1. Hard copy of 303(d) list of water bodies and/or watersheds. The list must include the pollutant or stressors, (pollutant sources) ("unknown" is an acceptable answer), extent of impairment (e.g. miles of stream, acres of estuary), TMDL priority ranking and schedule (Start and end dates for TMDL development). The ACCESS file for GeoWBS has a report that will generate a draft and final 2002 list. Table 2

SR 3. Written summary of the overall considerations for listings, de-listings and priority setting.

4. Summary of rationale used to list or de-list specific water bodies and a summary for each request for ~~listing~~ or de-listing that were considered, but not recommended. Also, a summary of how each listing was prioritized. We strongly request this information in the form of fact sheets (like the templates distributed by region 5). Include rationale for changes made due to public comment or Board input. THIS IS ONLY FOR NEW LITINGS OR DELISTINGS—NOT THE 1998 LISTINGS. Appendix B

5. An electronic copy of the GeoWBS data files (the Geowbs.mdb and zipped Geodata files) that contain the above information.

~~6.~~ Copy of electronic data received for this listing. These data should be stored on the Regional and State Board shared drive, organized by water body and listed in a summary table.

~~7.~~ Copies of data received for this listing cycle, in hard copy format. These data should be organized by water body and listed in a summary table.

8. Documentation of the public participation process

Appendix A

a. Description of public process (i.e., Was it taken to Board and how)
b. Public solicitiation letter(s), Public notice(s)and length of notice period
c. Public Comments
d. Responses to comments
e. Board decisions
f. Copy of transcripts of public workshops or meetings. → dont have for original mtgs?

Admin Record 9. Copies of all staff reports, letters, memorandums, resolutions, etc. which were part of the listing process.

Table 2 10. Copies of all draft proposed 303d lists for public review.

Add to Table 2 or Table 4?

11. Summary table stating number of new listings and number of delistings.

need to create

12. Location of RWQCB file(s), which contain the individual water, body assessment data, information, etc. upon which the listing decision was made.

VI. Regional Board 303(D) List Submittal Schedule:

- Public Participation Schedule: August 31st
- Written summary of the overall considerations for listings, de-listings and priority setting: August 31st
- Other documentation: October 15th

State Board staff will ask the regions to submit their lists and supporting documentation by October to meet the requirement of a staff report by December. A couple of regions have already said they can't make that deadline. Unfortunately, that will still need to remain the State Board deadline. In those cases where the regions will not have taken their lists to their boards, they will still have staff reports by October. I will ask that they submit their staff reports and supporting documentation by then, and if their boards want changes in January the individual regions can submit those changes as comments to the State Board staff report. Also, it is not required that any lists be approved by Regional Boards--that decision is up to each region.

303(d) Information Summary Table

Region	Final List Hardcopy Due Oct 15	Summary of listing,delisting, prioritization considerations Due August 31	Listing, delisting rationale for specific waterbodies Due Oct 15	GeoWBS data files Due Oct 15	Electronic submittals Due Oct 15	Hardcopy submittals Due Oct 15
1		X	X		X	X
2		X	X		X	X
3		X	X		X	X
4		overdue				
5		X	X		X	X
6		overdue				
7		overdue				X
8		overdue				
9		overdue			X	X

Region	Public process Due Oct 15	Staff Report Due Oct 15	Other docs (memo, resolutions, etc.) Due Oct 15	Draft lists for public review Due Oct 15	Number of list changes- listings and delistings Due Oct 15	Reference to files used for listing/delisting decisions Due Oct 15
1	partial	X	X	X		X
2	partial	X	X	X	X	X
3	partial	X	X	X	X	X
4						
5	partial	X	X	X	X	X
6						
7						
8						
9						

From: Adam Laputz
To: Deborah Jayne
Date: 9/24/01 10:04AM
Subject: Contact Info

Here is Tom's contact info.

Tom Rosales
Director of Technical and Environmental Services
South Orange County Wastewater Authority
(949) 234-5419
tr@socwa.com

Thank you very much for calling him on this issue.

Adam

Added to
303d email list
15Oct01
-JS

Winston H. Hickox
Secretary for Environmental Protection

California Regional Water Quality Control Board

Central Valley Region

Robert Schneider, Chair

Gray Davis
Governor

Sacramento Main Office
Internet Address: http://www.swrcb.ca.gov/rwqcb5
3443 Routier Road, Suite A, Sacramento, California 95827-3003
Phone (916) 255-3000 • FAX (916) 255-3015

JMC 10/9
Deborah J 10/11
JS ✓
CA ✓

27 September 2001

TO: Interested Parties

NOTICE OF AVAILABILITY OF DRAFT STAFF REPORT ON RECOMMENDED CHANGES TO CALIFORNIA'S CLEAN WATER ACT SECTION 303(D) LIST AND REQUEST FOR COMMENTS

The California Regional Water Quality Control Board, Central Valley Region (Regional Board) is soliciting comments from the public on the *Draft Staff Report on Recommended Changes to California's Clean Water Act Section 303(d) List* (Report). The Report identifies those surface waters within the Central Valley region that do not meet applicable water quality standards. Copies of the report and the appendices can be found at http://www.swrcb.ca.gov/rwqcb5/TMDL/.

After receipt of public comments, the Report will be finalized and submitted to the State Water Resources Control Board (SWRCB) for their consideration. As required by Section 303(d) of the Clean Water Act, the SWRCB will provide the United States Environmental Protection Agency (US EPA) with a revised list of surface waters considered by the State to be impaired (not attaining water quality standards) after certain required technology based water quality controls are in place. It is anticipated that this submission will be provided to US EPA by April 2002, as required by federal regulations. The submission will be based on information and data available to the SWRCB and the Regional Water Quality Control Boards.

The Regional Board solicited information from the public to consider for the update of the 303(d) list on 21 February 2001. The public was requested to provide information by 15 May 2001. At this time, the Regional Board is only accepting public comments on the proposed changes to the 303(d) list and is not collecting additional information or data. Public comments must be received by the Regional Board no later than 2 November 2001. Comments may be submitted to:

Joe Karkoski
303(d) List Update Coordinator
California Regional Water Quality Control Board
Central Valley Region
3443 Routier Road, Suite A
Sacramento, CA 95827-3003

Comments may also be sent electronically to 303dlist@rb5s.swrcb.ca.gov .

10 Oct 01

Executive Officer's Report
Clean Water Act Section 303(d) List of Impaired Waters – 2002 Update

The presentation of the draft Clean Water Act Section 303(d) List of Impaired Waters – 2002 Update, originally scheduled for October 10, has been postponed and will be presented at the October 24th Board Meeting.

From: John Richards
To: James Smith
Date: 10/9/01 10:57AM
Subject: Re: 303d public workshop

I am aware that the regional board is not the decision-making entity in this situation; however, such lack of jurisdiction does not preclude a vocal and irate citizenry from abusing the regional board verbally for any perceived failure to provide adequate notice and opportunity for rumination prior to any opportunity for public participation. It is in a desire to thwart this spontaneous outpouring of vitriolic frustration with the government's lack of consideration for interested citizens' input that I suggest the regional board adhere to the time lines required notice & public participation set forth in the US EPA regs....

Your revised scenario should reduce the number of "we haven't had enough time to consider these proposed listings..." comments that you will get. This will allow the board to focus on the substantive issues that interested persons will want to articulate.

>>> James Smith 10/05/01 04:56PM >>>
Hi John,

I am sorry I missed you yesterday when you were down in San Diego. I want to follow up on an earlier email / reply you had with Christina Arias regarding the number of days a workshop must be noticed.

I want to remind you that Region 9 Board Members will be seeing the draft list only as an informational item and will take no formal action. The SWRCB will be conducting all formal public workshops and hearings on one 303(d) list update for the entire state.

We were originally planning to hold an informal public workshop with only 8 days notice so that we could squeeze it in before staff presents our draft 303(d) list update to Board Members on the 24th of October. What would be the implications of holding such a workshop with such a short notice?

In light of the language contained in 40 CFR 25 regarding public meetings, we are exploring a second scenario and would appreciate your comments. We will post the draft 303(d) list on our website and mail notices of its availability to the entire agenda mailing list early next week. The notice will explain the roles of the Regional Board and of the State Board. It will also solicit public comments and invite the public to a workshop to be held in 30 days. We will present the draft list as an informational item to Board Members as scheduled on the 24th of October. After the public workshop, we will make any necessary changes / updates to our draft list, forward them to SWRCB and present this update at the following Regional Board Mtg.

We feel this scenario complies with federal regulations, allows sufficient time for the public to review the list and formalize their comments and keeps the Regional Board apprized of updates to the 303(d) list and how the public has been involved.

Thank you for your advice,
-jimmy

J. Smith
Environmental Specialist
Region 9 Water Quality Control Board
*9771 Clairemont Mesa Blvd, Suite A
San Diego, CA 92124-1324
(858) 467-2732
FX (858) 571-6972
www.swrcb.ca.gov/rwqcb9

*New Address (efffective 1 Oct 01)

JR

California Regional Water Quality Control Board

Central Valley Region

Robert Schneider, Chair

Winston H. Hickox
Secretary for Environmental Protection

Gray Davis
Governor

Sacramento Main Office
Internet Address: http://www.swrcb.ca.gov/rwqcb5
3443 Routier Road, Suite A, Sacramento, California 95827-3003
Phone (916) 255-3000 • FAX (916) 255-3015

AM 10/4

Deborah J 10/4
FYI

27 September 2001

TO: Interested Parties

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California Regional Water Quality Control Board
Central Valley Region
3443 Routier Road, Suite A
Sacramento, CA 95827-3003

Comments may also be sent electronically to 303dlist@rb5s.swrcb.ca.gov .

From: <Kozelka.Peter@epamail.epa.gov>
To: <hsmythe@rb8.swrcb.ca.gov>
Date: 10/4/01 3:05PM
Subject: 303d listings based on tissue levels

just to clarify if there is any uncertainty......

In Aug. 1997 EPA, SWRCB and RWQCB staff convened to establish some common agreements about factors for 303(d) listing decisions.

1. listing could be made on fish tissue if they exceed applicable criteria: SWRCB max tissue residual levels, FDA action levels, NAS guidelines, and EPA tissue values for wildlife protection.
You should be aware that EPA is soon to promulgate some new mercury fish tissue values: 0.3 mg/ wet kg Hg. (this value is technically methylmercury not total mercury although for most fish one can assume that >95% of mercury in fish is indeed MeHg.) NOTE: This value is considerably lower than the previously cited 1.00 ppm (FDA action level).

2.Faulty data include: Toxic Substance Monitoring Program and State Mussel Watch EDL values which are not confirmed by risk assessment for human consumption. Thus if a waterbody was initially listed by using EDLs then the delisting may be considered.

feel free to call me to discuss this more,

Peter Kozelka, Ph.D.
EPA Region 9--Water Div.
75 Hawthorne St.
San Francisco, CA 94105
415-744-1941 fax -1078
www.epa.gov/region09/water/

CC: <smitj@rb9.swrcb.ca.gov>, <pvitale@rb8.swrcb.ca.gov>

From: "Linda Jones" <ljones@scap.occoxmail.com>
To: "James Smith" <smitj@rb9.swrcb.ca.gov>
Date: 10/4/01 1:14PM
Subject: 303d List

I went to your website and didn't find the list, only info on providing input etc. Will you have the 303d list on the site and if so, when? I am still waiting for a call back from the City of San Diego's staff to use their facility located in Kearny Mesa area on either the 17, 18 or 19th. The Encina facility was not available.
Thanks,
Linda Jones

From: James Smith
To: "ljones@scap.occoxmail.com".mime.Internet
Date: 10/4/01 1:27PM
Subject: Re: 303d List

Linda,

I think there was a bit of mis-understanding the other day when we spoke on the phone. To clarify, we hope to get the draft 303(d) list update on to our website early next week. Once it is posted, we will then look into scheduling a public workshop at which we will present the list update, the process involved and answer questions. The 17 - 19 of October are dates that we had tentatively thought about for this workshop.

If the workshop is not sufficient to address your concerns, then we can look to schedule a meeting with your organization. We have moved to a new facility, so we could probably meet here. We are under tight deadlines with the State Water Resources Control Board, so I do not see time to meet individually with SCAP until after the end of this month.

Please call me if you have questions. I hope this clears up the situation.

-jimmy

J. Smith
Environmental Specialist
Region 9 Water Quality Control Board
*9771 Clairemont Mesa Blvd, Suite A
San Diego, CA 92124-1324
(858) 467-2732
FX (858) 571-6972
www.swrcb.ca.gov/rwqcb9

*New Address (efffective 1 Oct 01)
9174 Sky Park Court, Suite 100
San Diego, CA 92123

Box 1

Mailed 20 Sep 01 to SWRCB

HU 1
Dana Point Harbor
Laguna Beach
Cristiantos Creek
Aliso Beach
Aliso Creek
Oso Creek
San Mateo Creek
Salt Creek
Segunda Deshecha Channel
Trabuco Creek
Sulphur Creek
San Juan Creek
Prima Deshecha Channel

HU 2
Santa Margarita River
Murrieta Creek
Sandia Creek
Rainbow Creek
Oceanside Jetty
Lake Skinner
De Luz Creek
Fallbrook Creek
Temecula Creek

HU 3
San Luis Rey River

HU 4
Reidy Creek
Agua Hedionda Creek
Agua Hedionda Creek (Caulerpa)
Encinitas Creek
Batiquitos Lagoon
Cottonwood Creek
Buena Vista Creek
Buena Vista Lagoon
Lake San Marcos
Loma Alta Creek
San Marcos Creek
San Eligo Lagoon

HU 5
Cloverdale Creek
Del Dios Creek
Felicita Creek
Green Valley Creek
Kit Carson Creek
Lake Hodges
San Dieguito Lagoon
Sutherland Reservoir

HU 6
Escondido Creek
Tecolote Creek
Tecolote Creek Estuary
Miramar Reservoir
Famosa Slough
Carol Canyon Creek
Los Penasquitos Creek
Mission Bay
Rattlesnake Creek
Rose Creek
Sorrento Valley

Box 2

Mailed to SWRCB
20 Sep 01

<u>HU 7</u>
San Diego River
Sycamore Canyon Creek
San Vicente Reservoir
Padre Barona Creek
Murray Reservoir
Fanita Creek
El Capitan Reservoir
Forrester Creek

<u>HU 8</u>
Switzer Creek
Paradise Creek Marsh
California St. Storm Drain
7th St. Channel
Chollas Creek

<u>HU 9</u>
Sweetwater Reservoir
Sweetwater River
Loveland Reservoir
F-G St. Salt Marsh

<u>HU 10</u>
Otay Creek
Lower Otay Reservoir

<u>HU 11</u>
Tijuana River
Tijuana River Estuary
Barret Reservoir
Cottonwood Creek
Kitchen Creek
La Posta Creek
Long Canyon Creek
Morena Reservoir
Noble Canyon Creek
Pine Valley Creek

Coastline, Various HU

From: Brennan Ott
To: James Smith
Date: 9/5/01 3:19PM
Subject: Fwd: Regional Board 303(d) List Submittal Package

Here is the email I sent to Diane Beaulaurier regarding how we should submit our 303d data.

I talked to her over the phone regarding this. She said how I laided out below regarding the e-data is fine. She also said for hardcopies of data, putting all the data for a particular waterbody in its own folder and then putting all the waterbody folders together by hydraulic unit # is sufficient.

Clarification: State Board wants hardcopies of paper data submitted & of electronic data submitted.

No need to digitize into electronic format all paper data submitted

5 Sep 01
Conversation w/ Ott
-JS

From: Brennan Ott
To: Diane Beaulaurier
Date: 8/20/01 9:54AM
Subject: Regional Board 303(d) List Submittal Package

Hi,

I am from R9 and have a few questions regarding how the data is to be put together.

E-Data:
Do you want a "big folder" created, containing all the data from all the water bodies that we have, with each waterbody being in its own folder inside the big one? Also, in regards to the "summary table", should this be a word document in the very beginning of the "big folder", listing all the waterbodies included? Do you want a list of all the files in each waterbody folder to be included in this list too? Is it OK if I burn this entire "folder" to disc and ship it to you that way? Thanks for your help.

Brennan

1 Sep 01

Executive Officer's Report

Clean Water Act Section 303(d) List of Impaired Waters – 2002 Update

The Section 303(d) list update process is being coordinated by the State Water Resources Control Board (State Board) as a single, statewide list update for submittal to the United States Environmental Protection Agency (USEPA). Staff conducted the public solicitation for new information, reviewed all readily available data and proposed additions and changes to the existing 1998 Section 303(d) List of Impaired Waterbodies. The draft list update will soon be available for public review and will be presented at an informational public workshop, tentatively scheduled for September 21, 2001. The revised draft Clean Water Act Section 303(d) List of Impaired Waters, 2002 Update will be presented to Board Members and the public at the October Regional Board Meeting.

Background

Section 303(d) of the federal Clean Water Act (CWA, 33 USC 1250, *et seq.*, at 1313(d)), requires States to identify waters that do not meet water quality standards after applying certain required technology-based limits (i.e. "impaired" water bodies). States are required to compile this information and submit it to USEPA for review and approval. This list is commonly known as the Section 303(d) list of impaired waters. Once listed, the Regional Board is mandated to prioritize each waterbody / watershed for subsequent development of total maximum daily loads (TMDLs). The purpose of a TMDL is to ensure that beneficial uses are restored and water quality standards are achieved. The State Board and Regional Boards have ongoing efforts to monitor and assess water quality, to prepare the Section 303(d) list and to develop the required TMDLs. The State's most recent Section 303(d) list was approved in 1998 and contains 509 waterbodies, many listed as being impaired for multiple pollutants. The Regional Board placed 36 water bodies on the 1998 list, with a total of 69 water body / pollutant combinations.

Role of Regional Board in Public Process

On behalf of the State Board, the Regional Board solicited data and information regarding water quality conditions of surface waters. Solicitation letters were sent out to the Regional Board Agenda mailing list and newspaper notices were posted on March 7, 2001. At the same time, a Section 303(d) List of Impaired Waterbodies 2002 Update information page was added to the Regional Board's website. Two public workshops were held (April 4, 2001 and May 3, 2001) to give an informational overview of the Section 303(d) listing process, solicit information and to provide the opportunity for public comments, questions and concerns to be expressed and addressed. The solicitation period closed on May 15, 2001 and resulted in 60 unique sets of data and information submitted to the Regional Board for review and analysis.

The Regional Board has finished analysis and critical review of all submitted data and information and created an initial draft list of additions and modifications to the existing Section 303(d) list of impaired waterbodies. The draft list is currently undergoing internal review and is subject to change. The draft update recommends the addition of 22 new waterbodies to the Section 303(d) list. Also recommended is the addition of 6 new pollutants to previously listed waterbodies and changes in the extent of impairment for 17 previously listed waterbodies. No de-listings are recommended. Previously listed waterbodies were only re-evaluated if new data / information was available.

The Draft Clean Water Act Section 303(d) List of Impaired Waters, 2002 Update is scheduled to be posted on the Regional Board's website during the week of September 10, 2001. Concurrently, a notice of the list's availability on the web (and at the office) will be mailed and will include information regarding a public workshop tentatively scheduled for September 21, 2001. The workshop will provide information on the process involved in creation of the Section 303(d) List, the waterbodies and pollutants listed and give the public a chance to comment on the draft list. On a regional level, public comments will be accepted, responded to orally and considered in finalizing the draft list for submittal to the State Board. The revised draft Clean Water Act Section 303(d) List of Impaired Waters, 2002 Update will be presented at the October 10, 2001 Regional Board meeting as a status report / informational item that will require no formal Board action. The draft list will be submitted to the State Board on October 15, 2001.

Role of State Board in Public Process
The State Board will formulate a single, statewide draft Section 303(d) list based on the recommended draft list received from each Regional Board. This coming winter, the State Board will conduct a full formal public review and comment period, develop written responses to comments, conduct public workshop(s) and conduct a public hearing(s) at which the State Board will consider adoption of the draft statewide 303(d) list. The statewide list will then be submitted to the USEPA in the form of the State's biennial report on water quality. This information will in turn be submitted by USEPA to Congress pursuant to Section 305 of the Clean Water Act (33USC 1315).

SCAP
SOUTHERN CALIFORNIA ALLIANCE OF
PUBLICLY OWNED TREATMENT WORKS

JK 9/6

Deborah J 9/7/01

(1) let's discuss & would like a copy of the NRC June 2001 report, also I would like to discuss the 2-step concept for 303d.

(2) Share w/ your TMDL & 303d team.

(3) This is a significant correspondence - retain in file

JS ~~..~~ Pls File

CA ... Pls Rtn to JS

August 28, 2001

Art Baggett, Chair
State Water Resources Control Board
1001 I Street
P.O. Box 100
Sacramento, CA 95814

Dear Chairman Baggett:

Attached, please find the Southern California Alliance of Publicly Owned Treatment Works' (SCAP) recent submittals to EPA on their August 9, 2001 Federal Register proposal to delay the TMDL rule and the 2002 303 (d) listing deadline. We think our comments may be helpful to your staff as they embark on developing policy and guidance for the listing process. As you are probably aware, EPA is proposing among other things, to extend the deadline for the 2002 303 (d) list submittal for six months (i.e. until October 2002). If the Agency moves ahead with this proposal, we strongly recommend that the SWRCB and RWQCBs extend the timeframe for the State's 303 (d) listing process as well, in order to allow more time for the RWQCBs to conduct a thorough review of their data and to conduct a public review process, prior to submitting their proposed lists to the SWRCB. Due to the current time crunch, some RWQCBs have told us that they do not have time to allow public review or comment on their draft lists, or to present the proposed lists to their Board members. We believe, therefore, that this extension, if approved, presents a perfect opportunity to ensure that the RWQCBs, as well as the SWRCB, have enough time to prepare and receive input on their 2002 lists.

We look forward to the opportunity to assist you in any manner necessary as you move forward with your policy for assessment and listing methodologies for TMDLs and 303 (d) listing.

Sincerely,

Raymond C. Miller
Executive Director

Attachments

30200 Rancho Viejo Road, Suite B
San Juan Capistrano, CA 92675
Fax: 949/489-0150 Tel: 949/489-7676

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SCAP
SOUTHERN CALIFORNIA ALLIANCE OF
PUBLICLY OWNED TREATMENT WORKS

August 28, 2001

W-98-31-III TMDL Comment Clerk
Water Docket (MC-4101)
U.S. Environmental Protection Agency
1200 Pennsylvania Avenue, N.W.
Washington, DC 20460

Dear Comment Clerk:

COMMENTS ON PROPOSED DELAY OF EFFECTIVE DATE OF REVISIONS TO THE WATER QUALITY PLANNING AND MANAGEMENT REGULATION AND REVISIONS TO THE NPDES PROGRAM IN SUPPORT OF REVISIONS TO THE WATER QUALITY PLANNING AND MANAGEMENT REGULATIONS (66 FED. REG. 4817)

The Southern California Alliance of Publicly Owned Treatment Works (SCAP) appreciates the opportunity to comment on the proposed delay of the effective date of revisions to the Water Quality Planning and Management Regulations and Revisions to the National Pollutant Discharge Elimination System Program. We are submitting our comments on the proposed revision of the date for state submission of the 2002 list of impaired waters under separate cover. SCAP's fifty-five public agency members provide wastewater and water services to over sixteen million residents in Southern California. We offer the following comments for your consideration:

1. SCAP supports the proposal to delay the effective date of the July 2000 Rule to April 30, 2003 because of the many unresolved issues concerning the regulation. We believe it is wise for EPA to take time to address the recommendations of the National Research Council's June 2001 Report, "Assessing the TMDL Approach to Water Quality Management" (hereinafter referred to as the "NRC Report"), as well as to address stakeholder' concerns.

2. SCAP supports EPA's proposal to fully analyze the findings and recommendations of the NRC Report. We believe that many of the conclusions of the NRC Report are sound, and agree with a number of the report's recommendations. In particular,

we endorse the NRC recommendation that States should develop appropriate use designations for waterbodies in advance of assessment and refine these use designations prior to TMDL development. *NRC Report at 3.* We also strongly support the concept of dividing the 303 (d) list into a preliminary list and an action list, which would allow States to move those waters for which there is a lack of adequate water quality standards or data and analysis back to a preliminary list for further assessment. *NRC Report at 4.*

3. While we support EPA's stated intent of studying better ways to construct the TMDL program with a broad array of interested parties, SCAP is concerned about how that process will be conducted. In particular, we wish to stress that EPA should make the process as "transparent" as possible, and that parties to the litigation over the rule should be afforded extensive opportunities for consultation during the process of revising the rule. Otherwise, the odds are high that further litigation will ensue and impede the implementation of this program indefinitely.

4. SCAP particularly wishes to emphasize the need for EPA to promote state development of 1) processes to review and revise water quality standards (WQS) (designated uses and/or water quality criteria) to ensure the foundation of the TMDL program is on solid ground and limited resources are applied effectively and 2) statistically rigorous methodologies for considering and evaluating data to determine which waterbodies should be listed under 303 (d).

5. SCAP strongly recommends that EPA allow existing National Pollutant Discharge Elimination System (NPDES) permit limits to be upheld in the interim period before TMDLs are complete. The stringent approach to so-called "interim permitting" advocated by EPA Region IX in California last year, which included no not loading requirements, mass caps, elimination of dilution for listed pollutants, was not mandated by the Clean Water Act, and at a practical level, was unworkable.

6. SCAP also recommends that EPA reconsider the regulatory provision requiring EPA to reissue administratively continued permits if the state does not do so within a certain time frame. We believe that this improperly usurps delegated state authority over the NPDES program, and should be deleted from the rule.

Thank you for the opportunity to comment. SCAP looks forward to participating in EPA's review of the TMDL and NPDES regulations in the coming months.

Respectfully,

Raymond C. Miller

Raymond C. Miller
Executive Director

cc: Francoise Brasier
U.S. Environmental Protection Agency
Office of Wetlands, Oceans and Watersheds
4503 F, U.S. EPA
1200 Pennsylvania Avenue, N.W.
Washington, DC 20460

Art Baggett, Chair
State Water Resources Control Board
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Sacramento, CA 95814

SCAP

SOUTHERN CALIFORNIA ALLIANCE OF PUBLICLY OWNED TREATMENT WORKS

August 21, 2001

W-98-31-III TMDL Comments Clerk
Water Docket (MC-4101)
U.S. Environmental Protection Agency
1200 Pennsylvania Avenue, N.W.
Washington, DC 20460

Dear Comments Clerk:

COMMENTS ON PROPOSED REVISION OF THE DATE FOR STATE SUBMISSION OF THE 2002 LIST OF IMPAIRED WATERS (66 FED. REG. 41817)

The Southern California Alliance of Publicly Owned Treatment Works (SCAP) appreciates the opportunity to comment on the proposed rulemaking revising the date for state submission of the 2002 list of impaired waters. SCAP's fifty-five public agency members provide wastewater and water services to over sixteen million residents in Southern California. We support the proposed revisions of the date for state submission of the 2002 List of Impaired Waters from April 2002 until October 2002.

Based on our review of the listing process being followed in California for the 2002 list update, we believe it would be extremely helpful to the State if EPA were to extend the deadline for list submittal. Although the State Water Resources Control Board (SWRCB) and nine (9) Regional Water Quality Control Boards (RWQCBs) in California began the process of preparing their 2002 303 (d) lists earlier than ever before (about a year before the deadline), for a variety of reasons, the process is still compressed. Of primary concern to SCAP is the lack of a clearly defined listing methodology and inconsistent (and in some cases, insufficient) opportunities during the process for public participation. For instance, each of the 9 RWQCBs appears to be following a somewhat different process for public participation. Likewise, the RWQCBs and the SWRCB each seem to be deciding independently on their own assessment criteria and listing methodology.

We are greatly concerned that the SWRCB and RWQCBs do not have a uniform listing methodology or guidance that they are using to prepare the 2002 303 (d) list. It is our understanding that time constraints, plus the state of flux of the federal regulations, are the primary reasons the state has held off on developing a methodology. Thus, we believe that EPA's plan to release listing guidance in the near future is appropriate and could be extremely helpful. However, we are concerned that there will still be

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insufficient time for States to review the guidance and revise their listing processes – which may entail revisions to the data gathering and analysis that they are now in the middle of – and adopt their lists by October 2002. Additionally, if California were to adopt a new listing methodology, this action might well entail a full regulatory process, which typically takes a minimum of 9-12 months. Therefore, we believe that EPA should consider allowing even more time for States to prepare their lists, perhaps by adopting a provision allowing extensions on an as-needed basis to allow regulatory actions such as the adoption of a statewide listing methodology.

With respect to the development of the listing guidance, we offer the following comments for your consideration:

1. Based on our preliminary review of the report, we concur with many of the National Research Council's conclusions and recommendations that EPA should adopt statistical approaches to monitoring design, data analysis, and impairment assessment (NRC, June 2001at 43).
2. States should be required to report the statistical properties of the sample data analyses used to make listing determinations (NRC, June 2001 at 43).
3. SCAP requests increased transparency of the listing and delisting process (see attached SCAP letter to the LA Regional Water Board dated June 29, 2001).
4. SCAP encourages EPA to retain the following requirements currently in the July 2000 rule for States in the listing process:
   - ✓ A publicly reviewable document;
   - ✓ A description of how different types of data will be evaluated;
   - ✓ Explanation of how the following factors relating to listing will be considered: data quality, age, degree of confidence, degree of exceedances;
   - ✓ Description of procedures for collecting and using ambient water quality data;
   - ✓ Description of methods and factors to develop a prioritized schedule;
   - ✓ Requirement to develop listing methodology which includes descriptions of factors used to "delist" waterbodies;
5. EPA should require States to prepare 305 (b) reports that fully comply with the Clean Water Act as part of the data and information needed to list impaired waterbodies. In the past, 305 (b) reports have not properly analyzed the economic and social costs, the economic and social benefits, the description of the nature and extent of non-point sources of pollutants, recommendations as to the programs that must be undertaken to control each category of such sources and an estimate of the costs of implementing such programs. Without these elements, the 305 (b) reports lack sufficient baseline information to provide decisionmakers with the information needed to determine the true costs of meeting adopted water quality standards and thus to make necessary adjustments to the standards to the extent that they are found not to be attainable.

Thank you for the opportunity to comment. We applaud EPA's proposal to revisit the new TMDL regulation and the listing process and develop a reasonable, practical approach to this program.

Respectfully,

Raymond C. Miller
Executive Director

cc: Francoise Brasier
U.S. Environmental Protection Agency
Office of Wetlands, Oceans and Watersheds
4503 F, U.S. EPA
1200 Pennsylvania Avenue, N.W.
Washington, DC 20460

Art Baggett, Chair
State Water Resources Control Board
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SCAP

SOUTHERN CALIFORNIA ALLIANCE OF
PUBLICLY OWNED TREATMENT WORKS

June 29, 2001

Dennis Dickerson, Executive Officer
Los Angeles Regional Water Quality Control Board
320 W. 4th Street, Suite 200
Los Angeles, CA 90013

Re: SCAP Comments on 2002 Water Quality Assessment and Update of the 303 (d) List of Impaired Waterbodies

Dear Mr. Dickerson:

On behalf of the Southern California Alliance of Publicly Owned Treatment Works (SCAP), I am pleased to submit comments on the pending 305 (b) Water Quality Assessment and the 303 (d) list. SCAP's fifty-six public agency members provide wastewater and water services to over sixteen million residents in Southern California. The following comments were prepared by a workgroup of SCAP members.

1. SCAP encourages the Regional Board to carefully read and consider all comments submitted individually by our member agencies.

2. Under the Clean Water Act, as part of their biennial water quality assessments required under Section 305 (b), states are supposed to prepare analyses, among other things, of the extent to which "fishable/swimmable" uses have been or will be achieved, and what additional actions are necessary to achieve them; an estimate of the environmental impact, the economic and social costs, the economic and social benefits, and the estimated date of achievement; and a description of the nature and extent of nonpoint sources of pollutants, recommendations as to the programs which must be undertaken to control each category of such sources, and an estimate of the costs of implementing such programs. *33 U.S.C. Sec. 1315* The Regional Board must complete the required analyses during its water quality assessment, and we recommend that this be done prior to the 303 (d) listing process. We also request that a draft of the 305 (b) report be made available to the public for comment prior to being finalized and submitted to the State Water Resources Control Board.

3. SCAP supports the idea of a "preliminary list" or "watch list, on which waterbodies with inadequate or insufficient data would be placed in lieu of the 303 (d) list. Waters on the watch list would be targeted for further data gathering and assessment before either being placed on the 303 (d) list or designated as supporting the beneficial use(s). The National Research Council suggested such a list in their 2001 report assessing the effectiveness of TMDLs.[1] This has the potential to greatly reduce

[1] Assessing the TMDL Approach to Water Quality Management, prepublication copy, 2001.

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the burden caused by allocating valuable resources to addressing waters that may not truly be impaired, and focus funding and effort on true impairments.

4. SCAP urges caution regarding extrapolation of impacts on a specific waterbody based on data from a different body of water. Regional data, which have been generalized from limited data, when used, must be utilized appropriately.

5. SCAP believes that the Regional Board must only use adopted water quality standards, such as water quality objectives that have legally been adopted in the Basin Plan and approved by the State Water Resources Control Board, the Office of Administrative Law, and EPA, as the basis for the 305 (b) report or 303 (d) listings. Informal criteria that have not been formally adopted in accordance with Water Code requirements and the Administrative Procedures Act are known as "underground regulations" and cannot be legally used as the basis for the water quality assessment or 303 (d) listing.[2]

6. The Regional Board should specify what factors (including those listed below) are considered as "evidence," and how such evidence is weighted in making use of support/non-support decisions.

    a. Consider spatial, temporal (at several scales), and hydrologic variations and their effects on water quality when preparing the 2002 303 (d) list. We recommend that the Regional Board adopt a "weight of evidence" approach in preparing the 303 (d) list. Among other things, this will necessitate an understanding of variability in water quality data. In Southern California, stream flow is one of the largest sources of variability in water quality data. Stream flow is dependent on spatial, temporal (especially seasonal), and hydrologic variations. Not accounting for the effects of stream flow on water quality can bias the data set with respect to making impairment determinations. For the weight of evidence approach, one also will need to know how spatial variation was assessed, especially as it relates to effluent-dependent waterbodies. A good weight of evidence approach needs sample sets that are spatially and temporally representative of conditions in the waterbody. Sample locations should be characteristic of the main water mass or distinct hydrologic areas.

    b. For uses related to aquatic life, consider biological indicators as having a greater weight than pollutant concentration levels, to the extent that some waters may have unimpaired beneficial uses even though some chemical criteria have been exceeded. Among other reasons, this may occur because water quality objectives or criteria that are based on national guidance may not be reflective of local or site-specific conditions.

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[2] Cal. Gov. Code Sec. 11340 defines "regulation," in relevant part, as "every rule, regulation, order, or standard of general application or the amendment, supplement, or revision of any rule, regulation, order, or standard adopted by any state agency to implement, interpret, or make specific the law enforced or administered by it." Cal. Gov. Code Sec. 11342 An "underground regulation" is invalid and unenforceable because it has not been promulgated in accordance with the Administrative Procedures Act. *Frankel v. Kizer*, 21 Cal. App. 4th 743, 747 (Cal. App. 2d Dist., Dec. 13, 1993).

c. Consider on a case-by-case basis, whether or not a waterbody is oligotrophic, mesotrophic, or eutrophic and provide criteria for each type.

d. Eliminate subjective criteria such as "significant amount observed."

7. In the 1997 interagency 303 (d) listing guidance, EPA and SWRCB directed the Regional Boards to delist waters if certain factors were met. One guideline that does not appear to have been fully implemented called for recognition of control measures already in place – or expected to be installed within the next listing cycle – that will result in protection of beneficial uses. Control measures that should be considered an adequate basis for delisting include permits, clean up and abatement, cease and desist, or time schedule orders, and watershed management plans that are enforceable and include a time schedule for compliance with objectives. Prior EPA 303 (d) guidance also recommended this be taken into account. For example, within the Los Angeles Region, many inland waters are listed as being impaired by ammonia, yet all of the publicly owned treatment works are under compliance schedules to meet the ammonia water quality objectives contained in the Basin Plan in the next 1-2 years. Presumably, these waters will come into compliance with the ammonia objective when these dischargers meet this requirement. Therefore, we recommend that the Regional Board review these and other 303 (d) listings for which enforceable requirements have been adopted during this listing cycle.

8. In reviewing your prior staff reports regarding adoption of water quality assessment and/or 303 (d) listing, there has been very little explanation provided regarding how assessment decisions were made. Therefore, the following items reflect SCAP's recommendations that we believe are essential for the 2002 water quality assessment process.

In a recent Draft EPA Consolidated Assessment and Listing Methodology (CALM) report, several good recommendations are made for how states should conduct their listing processes. We are including several items based on CALM, as well as some additional items, that summarize the analytical and public review process we recommend the Regional Board follow. These comments supplement the comments previously submitted by SCAP regarding opportunities for public participation in the water quality assessment process.

- A thorough explanation of the thinking process that went into each decision should be made available in writing.
- The Regional Board should document each of the types of data that support water quality decision-making and explain how they are used in the context of applicable water quality standards to support different water quality determinations.
- A description of and reference for the quality assurance procedures should be included in water quality assessment and listing documentation. The Regional Board should define data quality requirements and how they utilize and interpret data to make decisions about whether the waterbody is impaired or attaining water quality standards.

- Metadata for the field data, i.e., when measurements were taken, locations, number of samples, detection limits, etc., should be in the administrative record and, upon request, made available to interested parties. The Regional Board should recognize that not all data are of equal value for assessing water quality standards attainment/impairment. Results of chemical data or any other type of data analysis are of limited value unless they are accompanied by documentation about sample collection (SOPs), analytical methods, and quality control protocols. Electronic copies of data and metadata should be made available, upon request.
- When data from citizen volunteer group's water quality monitoring efforts is used, the name of the group, the hours of training in water quality assessment completed by members of the group, SOPs, documentation of training of volunteers in both sampling and field testing, and whether a state certified lab was utilized should be provided. Finally, these data must meet the Regional Board's prior agreed upon standards for data quality.
- Sample size is an important element of data quality. In general, in the CALM draft, EPA is recommending that in order to have a high level of confidence in the results, a sample size of at least 30 samples is necessary. Recognizing that sample size is a big debate, we believe that a statistically-bases approach should be used in the listing process, with an adequate sample size. Therefore, the 5 samples, and sometimes 3 samples, used in prior assessment and listing processes seem less than sufficient. Not withstanding all the arguments about sample size, the tremendous implications of attainment/impairment decisions argue for the use of rigorous and statistically-valid data sets.
- What are the compelling reasons to list a waterbody, and does one reason have more weight than another?
- Fact sheets that explain proposed listings and delistings, including constituents of concern, the data used, and the water quality standard and the basis for the decision to list or delist must be provided to the public when the list is made available for public review. This is absolutely essential to enable informed public review, and will go a long way towards instilling confidence in the process and analysis prepared by the Regional Board.

SCAP is very aware of the tremendous burden this process puts on the Regional Board staff. These comments imply changes that we think will improve the process. SCAP looks forward to working with you during this process and recommends informal workshop meetings for this purpose.

Regards,

Raymond C. Miller
Executive Director

cc: Debbie Smith
Renee DeShazo

This page is maintained by the National Academies Office of News and Public Information

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NEWS

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Read Full Report

Date: June 15, 2001
Contacts: Bill Kearney, Media Relations Officer
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FOR IMMEDIATE RELEASE

Water Quality Management Needs Improvement; Better Data Analysis and Two-Step Process Could Aid States

WASHINGTON -- A more science-based approach is needed to improve a federally mandated program that requires states to clean up the nation's lakes, rivers, and other bodies of water, says a new report from the National Academies' National Research Council. Despite three decades of progress in controlling discharges from waste-water treatment plants and industry, pollution from other sources is jeopardizing water quality and the ability of states to achieve further progress.

Under the 1972 Clean Water Act, each state must identify polluted waters, put them on its so-called 303d list, and establish what are known as Total Maximum Daily Loads (TMDLs), which determine the amount by which sources of pollution would need to be reduced to meet the state's standards. During previous decades, states focused on issuing permits to control industrial and municipal discharges into bodies of water from point sources, such as an identifiable pipe or channel. Now the focus has shifted to implementing the TMDL process and controlling pollutants, such as nutrients, bacteria, and sediments, that frequently come from various nonpoint sources, including urban storm water and agricultural runoff. And there is increased attention on other factors affecting water quality such as habitat alteration.

"State agencies need to use better data and tools to establish appropriate water quality standards, determine whether standards have been violated, and develop restoration plans," said Kenneth H. Reckhow, chair of the committee that wrote the report, and professor, Duke University, Durham, N.C. "The state of the science is sufficient to overhaul the current lists of impaired waters and aid states in determining more workable solutions for cleaning them up."

About 21,000 bodies of water have been placed on 303d cleanup lists. Because of time and resource constraints coupled with legal pressures, many water bodies were put on state lists without adequate water quality data, creating a large caseload requiring cleanup efforts, said the committee. Considerable uncertainty exists about whether some of these waters violate standards. In addition, other waters that are impaired have yet to be identified.

The report calls on EPA to implement a two-step process that puts certain waters on a preliminary list before moving them to the final 303d list of those that require cleanup. This approach would give states time to study those bodies of water for which scant data exist while concentrating efforts on sites found to be in greatest need. If no legal mechanism exists for states to move waters from the 303d list to a preliminary list, Congress should create one, the committee said. However, no body of water should remain on a preliminary list for more than a predetermined period that allows for problems to be identified and solutions developed.

To improve the TMDL process, states should develop more refined water quality standards including the use of biological measurements to complement physical and chemical ones. The report promotes greater use of statistical approaches for the design of monitoring programs and for the analysis of data to determine if standards have been violated. Scientific uncertainty -- caused, for example, by limited data or natural variability -- should be acknowledged and taken into account. So that TMDL plans are not halted because of a lack of scientific information, the states should adopt an approach called adaptive implementation, whereby plans are periodically assessed and revised using new data and scientific tools.

Since the TMDL program is a significant financial burden for states, Congress might consider aiding states through matching grants to carry out water quality studies, the committee added.

The TMDL process has become one of the most discussed and debated, environmental programs in the nation, as drafting and revising of the final rules for implementation and enforcement has taken place in the last year. Last October, Congress suspended EPA's implementation of these rules until further information could be gathered. In particular, Congress asked the National Research Council to examine the program's scientific basis for determining which waters are impaired and for developing TMDLs. Under 1992 regulations, states are required to meet a deadline of 8 to 13 years for establishing the TMDLs. Only six states have enough data to fully assess the condition of their waters, according to the General Accounting Office.

The committee's work was funded by the Environmental Protection Agency. The National Research Council is a private, nonprofit institution that provides science policy advice under a congressional charter granted to the National Academy of Sciences. A committee roster follows.

Read the full text of Assessing the TMDL Approach to Water Quality Management for free on the Web, as well as more than 1,800 other publications from the National Academies. Printed copies are available for purchase from the **National Academy Press** Web site or by calling (202) 334-3313 or 1-800-624-6242. Reporters may obtain a pre-publication copy from the Office of News and Public Information (contacts listed above). .

NATIONAL RESEARCH COUNCIL
Division on Earth and Life Studies
Water Science and Technology Board

Committee to Assess the Scientific Basis of the Total Maximum Daily Load Approach to Water Pollution Reduction

Public Participation

On January 2, 1998, the Regional Board distributed the existing 1996 303(d) List to the public and requested that interested parties submit recent data that staff could use to reassess water quality and water quality impairments. Additionally, staff held three workshops for interested parties, on January 28, 1998 in Ventura, and on January 30, 1998 and February 6, 1998 in Monterey Park. Draft 303(d) Lists were provided at these workshops, and staff summarized data used for the proposed listings and delistings. In addition to asking for additional water quality data at these workshops, staff also solicited data/comments from the public on the specific listings and delistings, the criteria used for listings and delistings, and the approach to ranking impaired waters and prioritizing and scheduling TMDLs. Although a schedule for implementing all TMDLs was not presented at the workshops, the approach to scheduling and the importance of synchronizing TMDLs with watershed management was discussed.

Furthermore, staff compiled data for concerned parties on a case-by-case basis, and held many discussions regarding water quality standards, impairment criteria, and the TMDL process.

Staff had intended to propose adoption of revisions to the 1996 303(d) List at a public meeting of the Regional Board on March 2, 1998. However, due to extensive public interest and comment, staff has delayed proposed adoption of revisions to the 1996 303(d) List until a public meeting of the Regional Board on April 13, 1998. Accordingly, a target date for receipt of written comments was extended from February 13, 1998 to March 6, 1998. Interested parties who have submitted written comments by the close of the comment period include those listed on the following page.

A summary of comments and staff's responses begins on page 23. Copies of the comment letters (alphabetically arranged, beginning on page 48) follow the summary of comments and responses. Please note that staff has not yet been able to fully consider comments received after March 6, 1998.

KC

SCAP

SOUTHERN CALIFORNIA ALLIANCE OF PUBLICLY OWNED TREATMENT WORKS

SAN DIEGO REGIONAL WATER QUALITY CONTROL BOARD

2001 JUL -5 P 12:13

KC 8/14/01
FILE

July 3, 2001

John Robertus
San Diego Regional Water Quality Control Board
9771 Clairemont Mesa Boulevard, Suite A
San Diego, CA 92124-1324

Re: SCAP Comments on 2002 Water Quality Assessment and Update of the 303 (d) List of Impaired Waterbodies

Dear Mr. Robertus:

On behalf of the Southern California Alliance of Publicly Owned Treatment Works (SCAP), I am pleased to submit comments on the pending 305 (b) Water Quality Assessment and the 303 (d) list. SCAP's fifty-six public agency members provide wastewater and water services to over sixteen million residents in Southern California. The following comments were prepared by a workgroup of SCAP members.

1. SCAP encourages the Regional Board to carefully read and consider all comments submitted individually by our member agencies.

2. Under the Clean Water Act, as part of their biennial water quality assessments required under Section 305 (b), states are supposed to prepare analyses, among other things, of the extent to which "fishable/swimmable" uses have been or will be achieved, and what additional actions are necessary to achieve them; an estimate of the environmental impact, the economic and social costs, the economic and social benefits, and the estimated date of achievement; and a description of the nature and extent of nonpoint sources of pollutants, recommendations as to the programs which must be undertaken to control each category of such sources, and an estimate of the costs of implementing such programs. *33 U.S.C. Sec. 1315* The Regional Board must complete the required analyses during its water quality assessment, and we recommend that this be done prior to the 303 (d) listing process. We also request that a draft of the 305 (b) report be made available to the public for comment prior to being finalized and submitted to the State Water Resources Control Board.

3. SCAP supports the idea of a "preliminary list" or "watch list, on which waterbodies with inadequate or insufficient data would be placed in lieu of the 303 (d) list. Waters on the watch list would be targeted for further data gathering and assessment before either being placed on the 303 (d) list or designated as supporting the beneficial use(s). The National Research Council suggested such a list in their 2001 report assessing the effectiveness of TMDLs.[1] This has the potential to greatly reduce

[1] Assessing the TMDL Approach to Water Quality Management, prepublication copy, 2001.

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the burden caused by allocating valuable resources to addressing waters that may not truly be impaired, and focus funding and effort on true impairments.

4. SCAP urges caution regarding extrapolation of impacts on a specific waterbody based on data from a different body of water. Regional data, which have been generalized from limited data, when used, must be utilized appropriately.

5. SCAP believes that the Regional Board must only use adopted water quality standards, such as water quality objectives that have legally been adopted in the Basin Plan and approved by the State Water Resources Control Board, the Office of Administrative Law, and EPA, as the basis for the 305 (b) report or 303 (d) listings. Informal criteria that have not been formally adopted in accordance with Water Code requirements and the Administrative Procedures Act are known as "underground regulations" and cannot be legally used as the basis for the water quality assessment or 303 (d) listing.[2]

6. The Regional Board should specify what factors (including those listed below) are considered as "evidence," and how such evidence is weighted in making use of support/non-support decisions.

   a. Consider spatial, temporal (at several scales), and hydrologic variations and their effects on water quality when preparing the 2002 303 (d) list. We recommend that the Regional Board adopt a "weight of evidence" approach in preparing the 303 (d) list. Among other things, this will necessitate an understanding of variability in water quality data. In Southern California, stream flow is one of the largest sources of variability in water quality data. Stream flow is dependent on spatial, temporal (especially seasonal), and hydrologic variations. Not accounting for the effects of stream flow on water quality can bias the data set with respect to making impairment determinations. For the weight of evidence approach, one also will need to know how spatial variation was assessed, especially as it relates to effluent-dependent waterbodies. A good weight of evidence approach needs sample sets that are spatially and temporally representative of conditions in the waterbody. Sample locations should be characteristic of the main water mass or distinct hydrologic areas.

   b. For uses related to aquatic life, consider biological indicators as having a greater weight than pollutant concentration levels, to the extent that some waters may have unimpaired beneficial uses even though some chemical criteria have been exceeded. Among other reasons, this may occur because water quality objectives or criteria that are based on national guidance may not be reflective of local or site-specific conditions.

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[2] Cal. Gov. Code Sec. 11340 defines "regulation," in relevant part, as "every rule, regulation, order, or standard of general application or the amendment, supplement, or revision of any rule, regulation, order, or standard adopted by any state agency to implement, interpret, or make specific the law enforced or administered by it." Cal. Gov. Code Sec. 11342 An "underground regulation" is invalid and unenforceable because it has not been promulgated in accordance with the Administrative Procedures Act. *Frankel v. Kizer*, 21 Cal. App. 4th 743, 747 (Cal. App. 2d Dist., Dec. 13, 1993).

c. Consider on a case-by-case basis, whether or not a waterbody is oligotrophic, mesotrophic, or eutrophic and provide criteria for each type.

d. Eliminate subjective criteria such as "significant amount observed."

7. In the 1997 interagency 303 (d) listing guidance, EPA and SWRCB directed the Regional Boards to delist waters if certain factors were met. One guideline that does not appear to have been fully implemented called for recognition of control measures already in place – or expected to be installed within the next listing cycle – that will result in protection of beneficial uses. Control measures that should be considered an adequate basis for delisting include permits, clean up and abatement, cease and desist, or time schedule orders, and watershed management plans that are enforceable and include a time schedule for compliance with objectives. Prior EPA 303 (d) guidance also recommended this be taken into account. For example, within the Los Angeles Region, many inland waters are listed as being impaired by ammonia, yet all of the publicly owned treatment works are under compliance schedules to meet the ammonia water quality objectives contained in the Basin Plan in the next 1-2 years. Presumably, these waters will come into compliance with the ammonia objective when these dischargers meet this requirement. Therefore, we recommend that the Regional Board review these and other 303 (d) listings for which enforceable requirements have been adopted during this listing cycle.

8. In reviewing your prior staff reports regarding adoption of water quality assessment and/or 303 (d) listing, there has been very little explanation provided regarding how assessment decisions were made. Therefore, the following items reflect SCAP's recommendations that we believe are essential for the 2002 water quality assessment process.

In a recent Draft EPA Consolidated Assessment and Listing Methodology (CALM) report, several good recommendations are made for how states should conduct their listing processes. We are including several items based on CALM, as well as some additional items, that summarize the analytical and public review process we recommend the Regional Board follow. These comments supplement the comments previously submitted by SCAP regarding opportunities for public participation in the water quality assessment process.

- A thorough explanation of the thinking process that went into each decision should be made available in writing.
- The Regional Board should document each of the types of data that support water quality decision-making and explain how they are used in the context of applicable water quality standards to support different water quality determinations.
- A description of and reference for the quality assurance procedures should be included in water quality assessment and listing documentation. The Regional Board should define data quality requirements and how they utilize and interpret data to make decisions about whether the waterbody is impaired or attaining water quality standards.

- Metadata for the field data, i.e., when measurements were taken, locations, number of samples, detection limits, etc., should be in the administrative record and, upon request, made available to interested parties. The Regional Board should recognize that not all data are of equal value for assessing water quality standards attainment/impairment. Results of chemical data or any other type of data analysis are of limited value unless they are accompanied by documentation about sample collection (SOPs), analytical methods, and quality control protocols. Electronic copies of data and metadata should be made available, upon request.
- When data from citizen volunteer group's water quality monitoring efforts is used, the name of the group, the hours of training in water quality assessment completed by members of the group, SOPs, documentation of training of volunteers in both sampling and field testing, and whether a state certified lab was utilized should be provided. Finally, these data must meet the Regional Board's prior agreed upon standards for data quality.
- Sample size is an important element of data quality. In general, in the CALM draft, EPA is recommending that in order to have a high level of confidence in the results, a sample size of at least 30 samples is necessary. Recognizing that sample size is a big debate, we believe that a statistically-bases approach should be used in the listing process, with an adequate sample size. Therefore, the 5 samples, and sometimes 3 samples, used in prior assessment and listing processes seem less than sufficient. Not withstanding all the arguments about sample size, the tremendous implications of attainment/impairment decisions argue for the use of rigorous and statistically-valid data sets.
- What are the compelling reasons to list a waterbody, and does one reason have more weight than another?
- Fact sheets that explain proposed listings and delistings, including constituents of concern, the data used, and the water quality standard and the basis for the decision to list or delist must be provided to the public when the list is made available for public review. This is absolutely essential to enable informed public review, and will go a long way towards instilling confidence in the process and analysis prepared by the Regional Board.

SCAP is very aware of the tremendous burden this process puts on the Regional Board staff. These comments imply changes that we think will improve the process. SCAP looks forward to working with you during this process and recommends informal workshop meetings for this purpose.

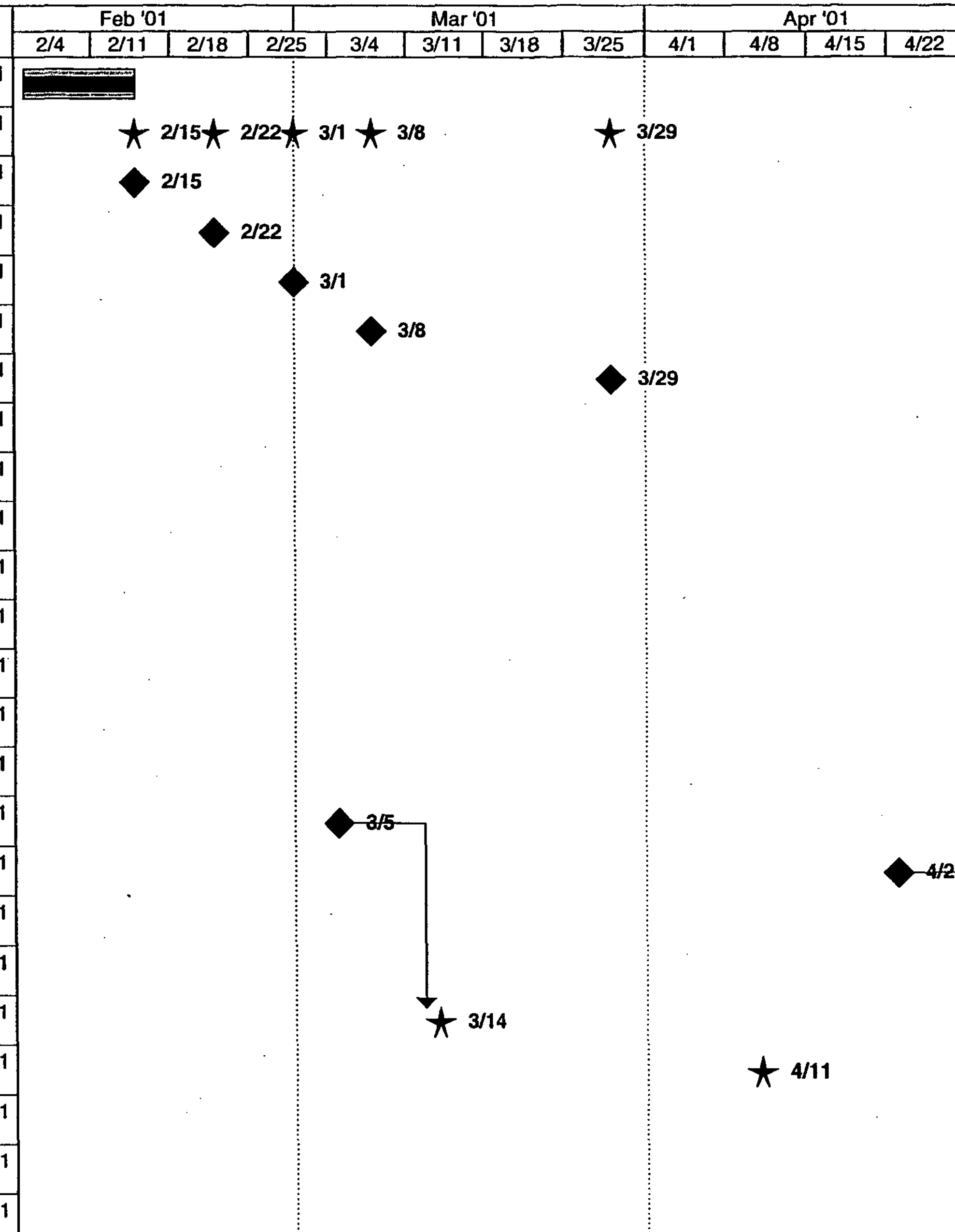
Regards,

Raymond C. Miller
Executive Director

cc: Keri Cole

303(d) Impaired Waterbodies List - 2002 Update

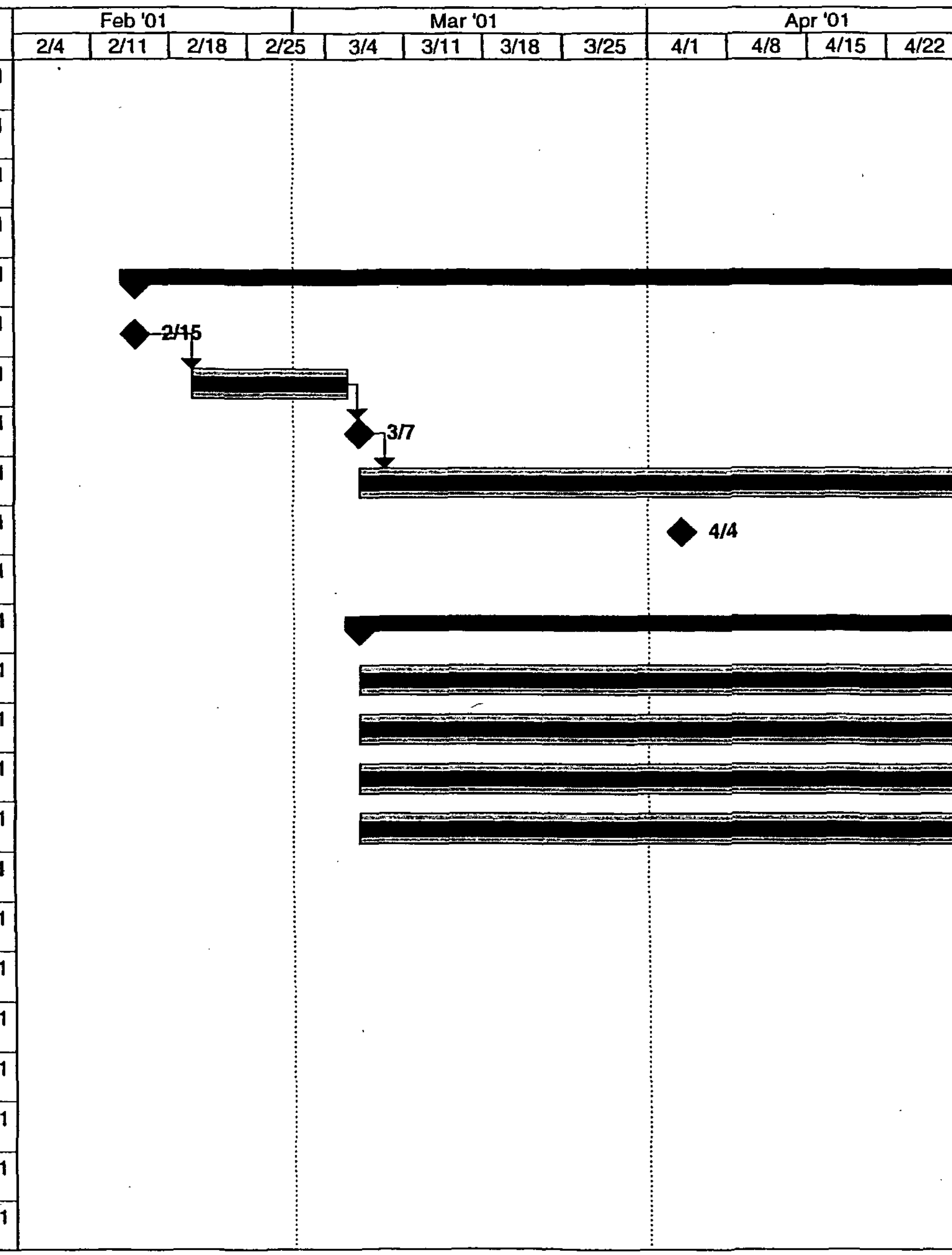
ID		Task Name	Start	Finish
1		**Review previous listing info**	Mon 2/5/01	Wed 2/14/01
2		**Team Meetings**	**Thu 2/15/01**	**Wed 9/26/01**
3		Listing Team Meetings 1	Thu 2/15/01	Thu 2/15/01
4		Listing Team Meetings 2	Thu 2/22/01	Thu 2/22/01
5		Listing Team Meetings 3	Thu 3/1/01	Thu 3/1/01
6		Listing Team Meetings 4	Thu 3/8/01	Thu 3/8/01
7		Listing Team Meetings 5	Thu 3/29/01	Thu 3/29/01
8		Listing Team Meetings 7	Mon 6/4/01	Mon 6/4/01
9		Listing Team Meetings 8	Wed 7/11/01	Wed 7/11/01
10		Listing Team Meetings 9	Wed 8/1/01	Wed 8/1/01
11		Listing Team Meetings 10	Tue 8/14/01	Tue 8/14/01
12		Listing Team Meetings 11	Fri 8/31/01	Fri 8/31/01
13		Listing Team Meetings 12	Wed 9/12/01	Wed 9/12/01
14		Listing Team Meetings 13	Wed 9/26/01	Wed 9/26/01
15		**Board Mtg Prep**	**Mon 3/5/01**	**Mon 9/24/01**
16		Board Mtg Prep 1 - EO Report	Mon 3/5/01	Mon 3/5/01
17		Board Mtg Prep 2 - EOSR	Mon 4/23/01	Mon 4/23/01
18		Board Mtg Prep 4 - EOSR	Mon 9/24/01	Mon 9/24/01
19		**Board Meetings**	**Wed 3/14/01**	**Wed 12/12/01**
20		Board Meetings 1 -EO Report	Wed 3/14/01	Wed 3/14/01
21		Board Meetings 2 -WQS Unit EO Rpt.	Wed 4/11/01	Wed 4/11/01
22		Board Meetings 3 -EOSR	Wed 5/9/01	Wed 5/9/01
23		Board Meetings 4 -WQS Unit EO Rpt.	Wed 6/13/01	Wed 6/13/01
24		Board Meetings 5 -WQS Unit EO Rpt.	Wed 7/11/01	Wed 7/11/01



last updated by KC 8/3/01

303(d) Impaired Waterbodies List - 2002 Update

ID		Task Name	Start	Finish
25	✓	Board Meetings 6 -WQS Unit EO Rpt.	Fri 9/14/01	Fri 9/14/01
26		Board Meetings 7 -EOSR	Wed 10/10/01	Wed 10/10/01
27		Board Meetings 8 -WQS Unit EO Rpt.	Wed 11/14/01	Wed 11/14/01
28		Board Meetings 9 -WQS Unit EO Rpt.	Wed 12/12/01	Wed 12/12/01
29	✓	**Solicitation of Public Info**	**Thu 2/15/01**	**Wed 5/16/01**
30	✓	Receipt of SWRCB draft letter/memo	Thu 2/15/01	Thu 2/15/01
31	✓	Draft R9 Letter/Notices & Set-up web address	Tue 2/20/01	Mon 3/5/01
32	✓	Send letter/Notice local papers/R9 website	Wed 3/7/01	Wed 3/7/01
33	✓	Catalogue all incoming data	Wed 3/7/01	Wed 5/16/01
34	✓	Conduct listing process workshop	Wed 4/4/01	Wed 4/4/01
35	✓	Close 60-day solicitation period	Tue 5/15/01	Tue 5/15/01
36		**Evaluation of >July '97 Data**	**Wed 3/7/01**	**Mon 8/6/01**
37		Review in-house/existing data	Wed 3/7/01	Fri 8/3/01
38	✓	Conduct University lit search	Wed 3/7/01	Fri 7/6/01
39		Review incoming data	Wed 3/7/01	Mon 8/6/01
40		Verify data	Wed 3/7/01	Mon 8/6/01
41		**Recommendation of List Update**	**Tue 8/7/01**	**Wed 10/31/01**
42		Prepare DRAFT (list & support info)	Tue 8/7/01	Fri 8/31/01
43		Post DRAFT listing update	Fri 8/31/01	Fri 8/31/01
44		Public review of DRAFT	Mon 9/3/01	Wed 10/3/01
45		Conduct public workshop (?)	Thu 10/4/01	Thu 10/4/01
46		Respond to comments & finalize recommendations	Tue 9/4/01	Wed 10/10/01
47		Inform Board of recommendations (adopt res.?)	Wed 10/10/01	Wed 10/10/01
48		Forward recommendations to SWRCB	Wed 10/31/01	Wed 10/31/01



last updated by KC 8/3/01

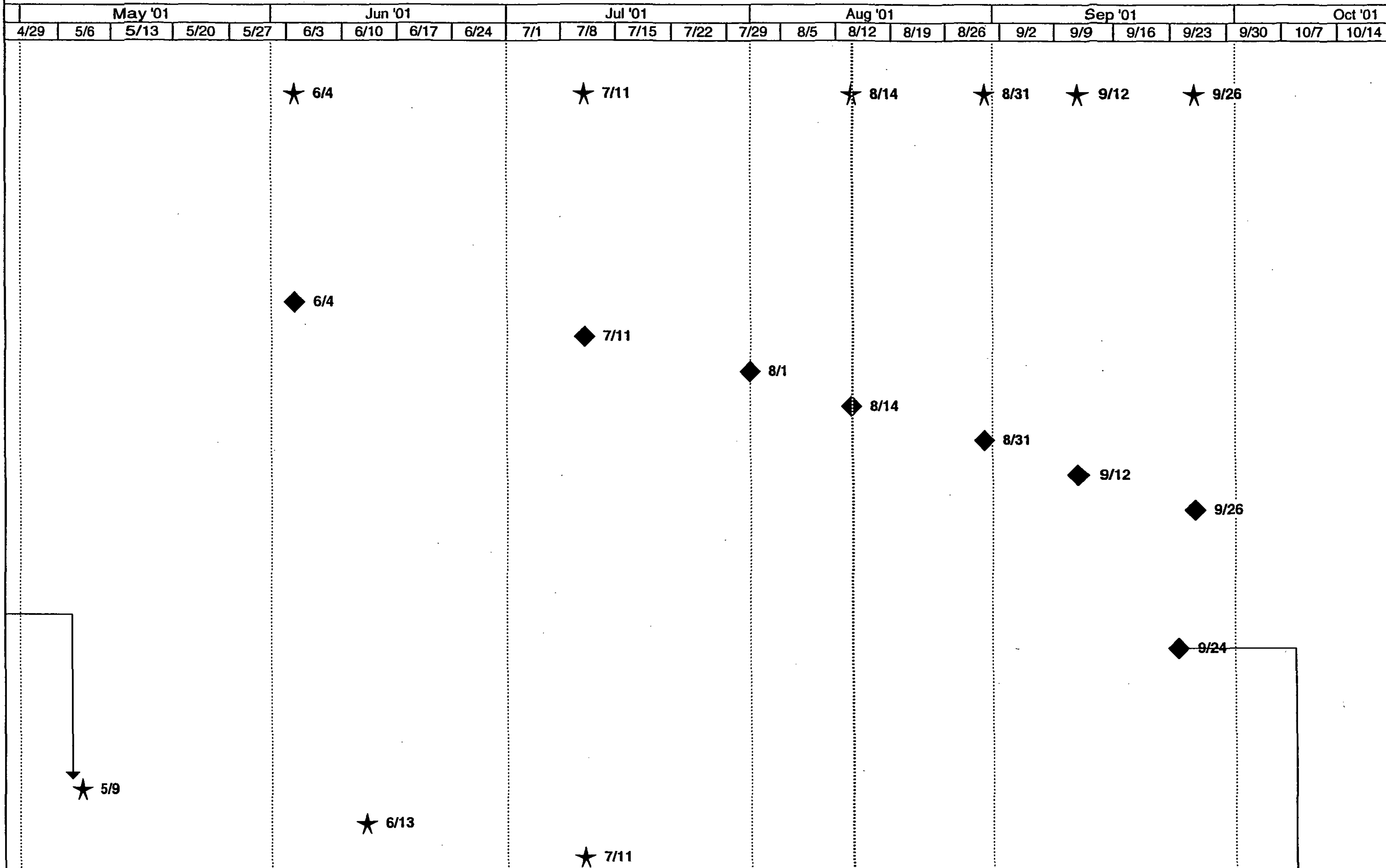
303(d) Impaired Waterbodies List - 2002 Update

ID		Task Name	Start	Finish
49		**SWRCB Submittal to EPA (tentative dates)**	**Wed 10/17/01**	**Mon 4/1/02**
50		Formulate Statewide recommendation	Wed 10/17/01	Mon 12/31/01
51		Conduct public review/comment	Wed 1/2/02	Tue 3/5/02
52		Conduct public workshops	Wed 1/2/02	Fri 2/1/02
53		Revise recommendations	Wed 3/6/02	Fri 3/29/02
54		Adopt updated list	Fri 3/29/02	Fri 3/29/02
55		Submittal To EPA	Mon 4/1/02	Mon 4/1/02

Feb '01				Mar '01				Apr '01			
2/4	2/11	2/18	2/25	3/4	3/11	3/18	3/25	4/1	4/8	4/15	4/22

last updated by KC 8/3/01

303(d) Impaired Waterbodies List - 2002 Update



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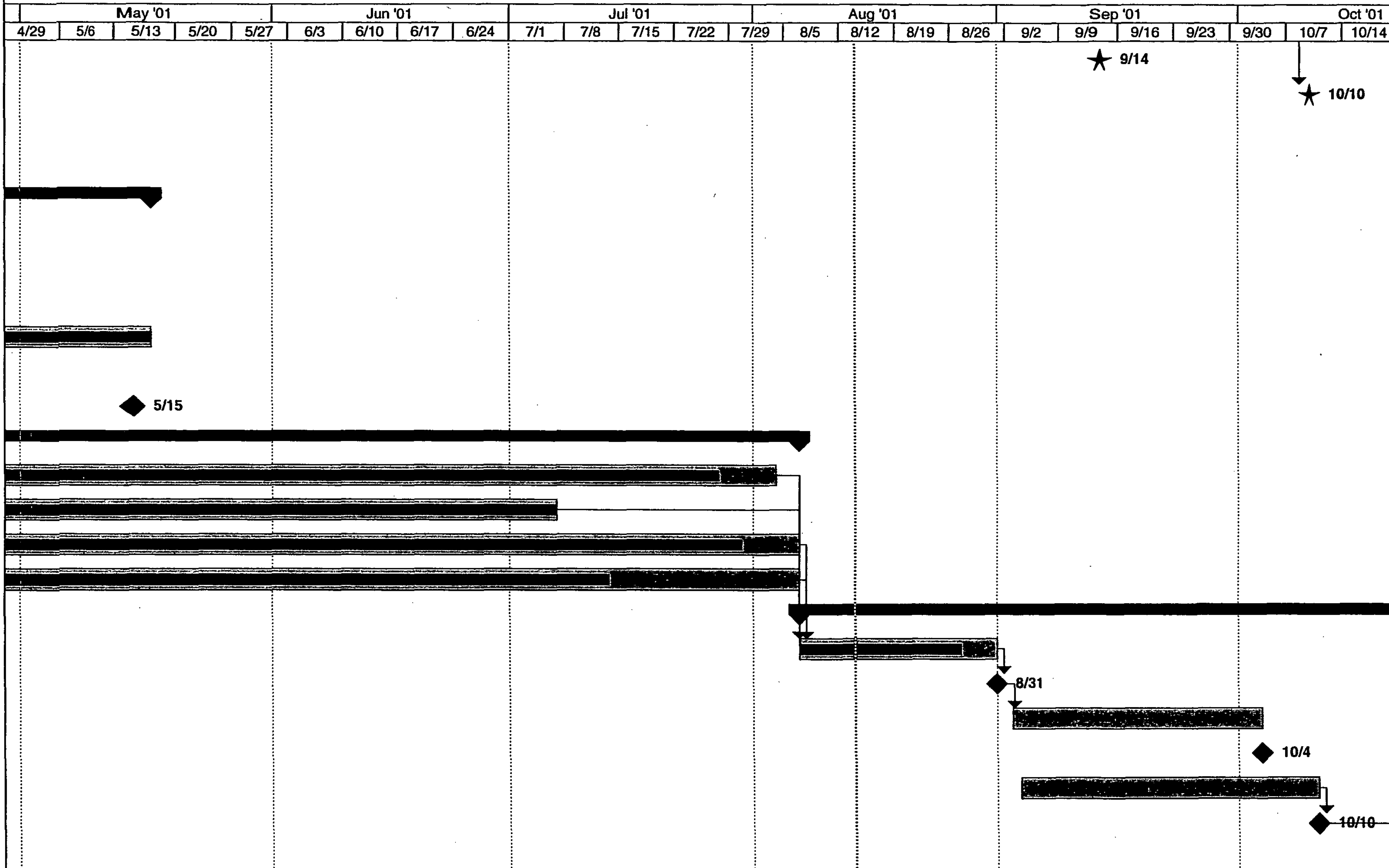

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303(d) Impaired Waterbodies List - 2002 Update

May '01					Jun '01				Jul '01					Aug '01				Sep '01				Oct '01		
4/29	5/6	5/13	5/20	5/27	6/3	6/10	6/17	6/24	7/1	7/8	7/15	7/22	7/29	8/5	8/12	8/19	8/26	9/2	9/9	9/16	9/23	9/30	10/7	10/14

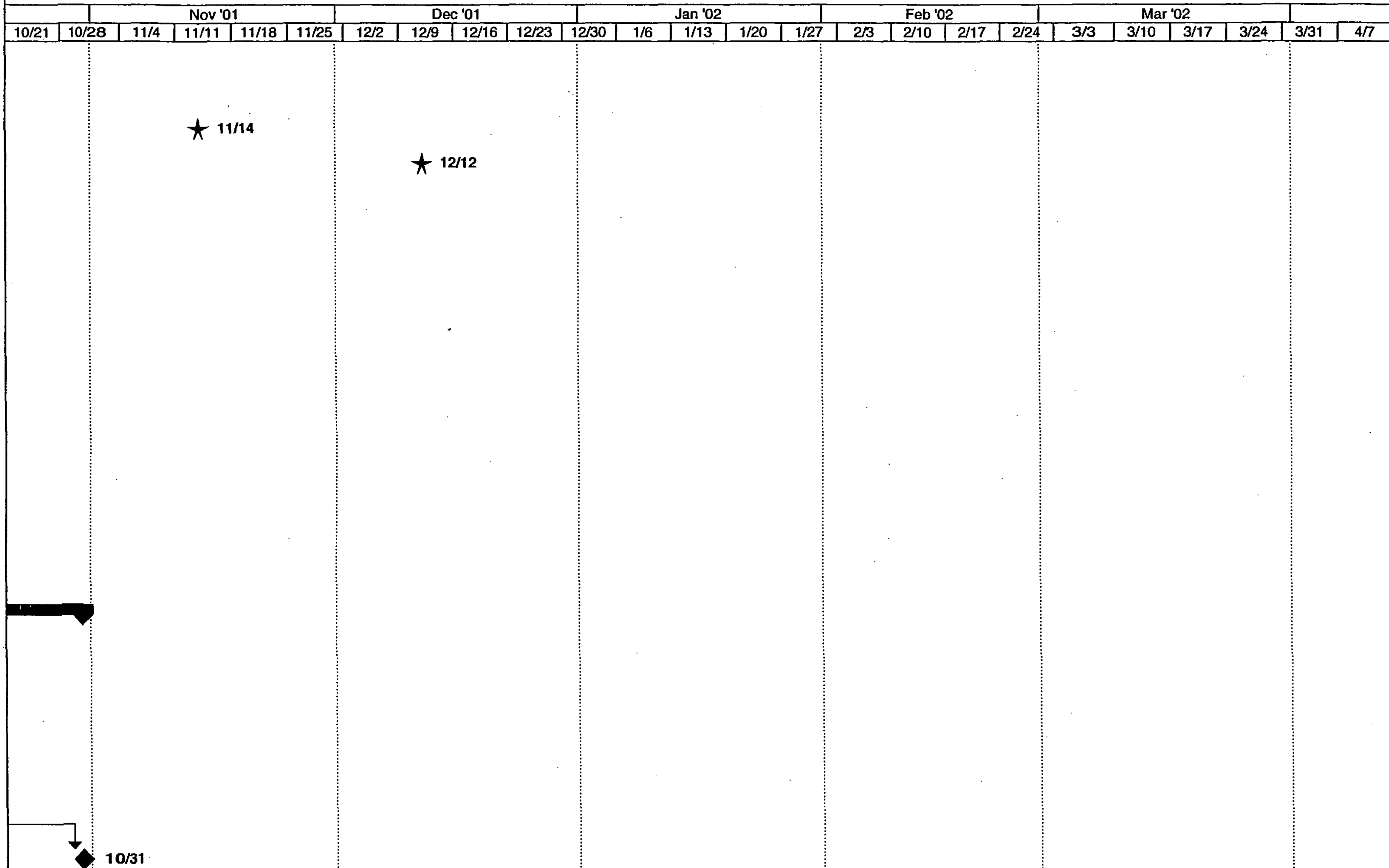
last updated by KC 8/3/01

303(d) Impaired Waterbodies List - 2002 Update

		Nov '01				Dec '01				Jan '02					Feb '02				Mar '02					
10/21	10/28	11/4	11/11	11/18	11/25	12/2	12/9	12/16	12/23	12/30	1/6	1/13	1/20	1/27	2/3	2/10	2/17	2/24	3/3	3/10	3/17	3/24	3/31	4/7

last updated by KC 8/3/01

303(d) Impaired Waterbodies List - 2002 Update



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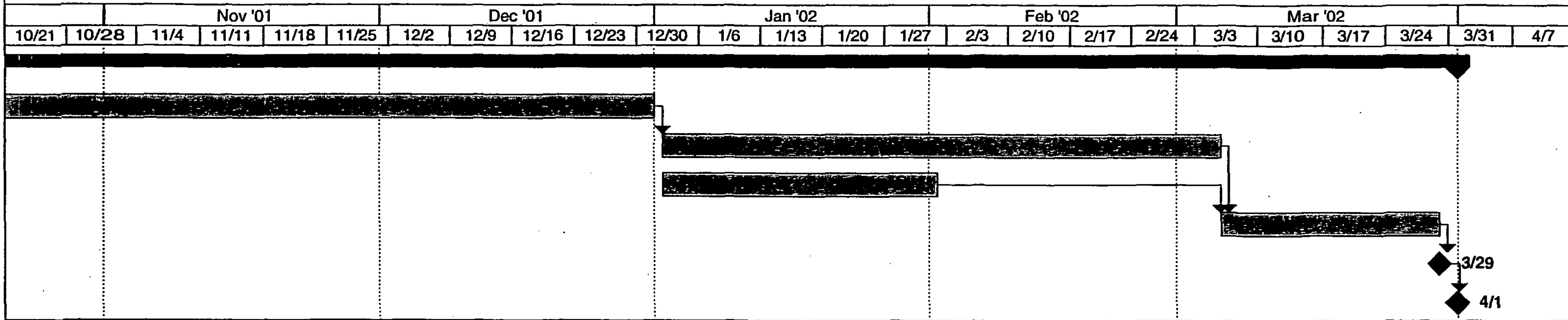
303(d) Impaired Waterbodies List - 2002 Update



<u>303d Things to Do –</u>
8/1/01 meeting – JS, KC, CA

1. Complete initial assessments of all waterbodies
   - ✓ check s:wqs\303dlist\potential sources STATUS.xls for outstanding work to be done

2. Review all write-ups, make adjustments, ensure consistency

3. Compile recommendations for impaired waterbodies list in format consistent with existing list
   - ✓ include new listings and changes to current listings

4. Compile list of "threatened" waterbodies and proposed action (e.g. future monitoring, assess SW permit info, etc.)

5. Prepare assessment methodology/rationale document to support recommendations (see attached DRAFT outline)

6. Post draft list on website and send out mailing for public review of draft list

7. Organize supporting documentation for Admin. Record
   - ✓ info submitted
   - ✓ in-house references
   - ✓ correspondences (emails, phone call reports, letters)
   - ✓ staff fact sheets & memos

8. Prepare public process description & schedule
   - ✓ include description of past & future, PowerPoint presentations, workshops attendance sheets, notes, etc.
9. Prepare for October meeting
   - ✓ EOSR report to Lori/Robertus
   - ✓ PowerPoint presentation describing entire process, rationale, recommendations

10. Input all info (303d listings and all other assessment info) into GeoWBS
   - ✓ Schedule Nancy Richard (or her replacement)from State Board to come down for 1 whole day to work with you & Lisa on inputting & reporting

2002 CWA Section 303d Listing of Impaired Waterbodies
California Regional Water Quality Control Board, San Diego Region

DRAFT Assessment Methodology and Rationale – Outline 8/1/01

1. Introduction
    a. purpose of assessment
    b. cite state/federal regulations & requirements

2. SDRWQCB's solicitation & data collection procedure
    a. Reference SWRCB letter & guidance
    b. Reference SDRWQCB public solicitation letter, newspaper notices, website posting
    c. Reference USPEA letter from Dave Smith re: sources to tap into
    d. Discuss public workshops & mtgs

3. Assessment Methodology
    a. Beneficial uses and water quality objectives
    b. General impairment guidance & references
        i. SWRCB memo guidance (i.e. cutoff dates, weight of evidence, etc.)
        ii. SWRCB & USEPA 1998 guidance
        iii. USEPA 1996 guidance
        iv. CALM
        v. LARWQCB 1996 guidance
        vi. Fla., Az guidance
    c. Criteria (tables, reference citations)
        i. Basin Plan
        ii. Beach closure/posting coliform stds.
        iii. Primary & secondary MCLs
        iv. CTR,& NTR
        v. MTRLS, FDA, etc.
        vi. Ocean Plan
        vii. Others, used…
    d. Weight of evidence approach
        i. Listing
        ii. Threatened
        iii. Not enough info
        iv. Changes to existing listings
        v. Discussion of fact sheets

4. TMDL prioritization
    a. Rationale/methodology/criteria

5. Summary of Recommendations

DRAFT
303(d) Listing Considerations
July 30,2001

This document contains a summary of the DRAFT 303(d) Listing Considerations. A conference call will be scheduled for the week of August 6th to receive Regional Board staff input on the document.

Outline:
I. SWRCB staff goals for the 2002 303(d) listing
II. PAG Consensus on Listing of Impaired Waters
III. PAG Consensus on Stakeholder Involvement
IV. SWRCB staff considerations for Listing Factors, Delisting Factors, Evaluation Criteria and TMDL Prioritization
V. Regional Board 303(D) List Submittal Package
VI. Regional Board 303(D) List Submittal Schedule
VII. Public Participation

I. SWRCB staff goals for the 2002 303(d) listing:

- Improve water quality
- Complete new 303(d) list by April 2002
- Produce a technically valid list
- Work with the Regions
  - Provide assistance where requested
  - Don't impede existing processes
  - Minimize changing Regions priorities
- Minimize new work for TMDL team and Regions
  - Don't reinvent the wheel
  - Design tasks to accomplish multiple purposes
- Avoid litigation
- Have listing process serve as public input into policy development

II. PAG Consensus on Listing of Impaired Waters:

State Board members and management have requested that the 2002 listing process be consistent with the recommendations of the AB 982 Public Advisory Group. The PAG believes that the critical issues related to the listing process are:

- Adequacy and consistency of funding and personnel resources at state and local levels
- Need for better program direction from the SWRCB and enhanced consistency among Regional Boards
- More comprehensive and effective statewide monitoring program
- Better utilization of all existing data
- Amount of information and scientific rigor needed for listing

- The State Water Resources Control Board should formally adopt a Policy to maximize the Regional Water Quality Control Boards consideration of existing data during the 303(d) process.

- The State Water Resources Control Board should formally adopt a Policy, and a means to implement the Policy, for the Regional Water Quality Control Boards on what constitutes reasonable minimum acceptable credible information. The Policy should also include the methods for determining whether to list or delist water segments on the Section 303(d) list consistent with Federal law.

III. PAG Consensus on Stakeholder Involvement:

- *Regional Board should be open to input during the TMDL process.*
- *TMDLs need not be based on consensus but everyone needs to be heard.*
- *The Regional Board should publish schedules for the start of the stakeholder participation process.*
- *Recommended framework for the TMDL development should include opportunities for public input, for new listing, for scoping of the TMDL, on the draft TMDL and on final adoption.*
- *A mechanism should be developed, including funding, to encourage and maintain balanced stakeholder representation, and assure stakeholders are afforded the opportunity to participate meaningfully, in accordance with TMDL deadlines.*
- *Regional Boards should consider education and outreach as part of TMDL development and implementation. Public outreach and education are important aspects in issue resolution and attaining water quality standards.*

IV SWRCB staff considerations for Listing Factors, Delisting Factors, Evaluation Criteria and TMDL Prioritization

Staff has attempted to develop factors and criteria that are technically valid and consistent with the work already completed by Regional Staff.

A. Listing Factors

Water bodies and associated pollutants should be recommended for addition to the 303(d) list if any one of these factors is met:

1. Effluent limitations or other pollution control requirements [e.g., Best Management Practices (BMPs)] are not stringent enough to assure protection of beneficial uses and attainment of SWRCB and RWQCB objectives, including those implementing SWRCB Resolution Number 68-16 "Statement of Policy with Respect to Maintaining High Quality of Waters in California" [see also 40 CFR 130.7(b)(1)]. This does not apply to non-attainment related solely to discharge in violation of existing WDR's or NPDES permit.

2. Fishing, drinking water, or swimming advisory currently in effect. This does not apply to advisories related to discharge in violation of existing WDR's or NPDES permit.

3. Beneficial uses are impaired or are expected to be impaired within the listing cycle (i.e. in next four years). Impairment is based upon evaluation of chemical, physical, or biological

integrity. Impairment will be determined by "qualitative assessment", physical/ chemical monitoring, bioassay tests, and/or other biological monitoring. Applicable Federal criteria and the Regional Board's Basin Plan water quality objectives determine the basis for impairment status.

4. The water body is on the previous 303(d) list and either: (a) monitoring continues to demonstrate a violation of objective(s) or (b) monitoring has not been performed.

5. Data indicate tissue concentrations in consumable body parts of fish or shellfish exceed applicable tissue criteria or guidelines. Criteria or guidelines related to protection of human and wildlife consumption include, but are not limited to, U.S. Food and Drug Administration Action Levels, National Academy of Sciences Guidelines, U.S. Environmental Protection Agency tissue criteria.

B. **Delisting Factors**

Water bodies may be removed from the list for specific pollutants or stressors if any one of these factors is met:

1. Objectives are revised (for example, Site Specific Objectives), and the exceedence is thereby eliminated.

2. A beneficial use is de-designated after U.S. EPA approval of a Use Attainability Analysis, and the non-support issue is thereby eliminated.

3. Faulty data led to the initial listing. Faulty data include, but are not limited to, typographical errors, improper quality assurance/quality control (QA/QC) procedures, or limitations related to the analytical methods that would lead to an improper conclusions regarding the water quality status of the water body.

4. It has been documented that the objectives are being met and beneficial uses are not impaired based upon an evaluation of available monitoring data. This evaluation should discuss foreseeable changes in hydrology, land use, or product use and describe why such changes should not lead to future exceedance.

5. A TMDL has been approved by the U.S. Environmental Protection Agency for that specific water body and pollutant (see 40 CFR 130.7(b)(4)).

6. There are control measures in place, which will result in protection of beneficial uses. Control measures include permits, clean up and abatement orders, and Basin Plan requirements which are enforceable and include a time schedule (see 40 CFR 130.7(b)(1)(iii).

C. Evaluation Criteria:

In general, the following hierarchy should be used in evaluating data relative to applicable water quality objectives:

1. Applicable numeric water quality objectives (contained in the Basin Plan) or water quality standards (contained in the federal California and National Toxics Rules). Both the Basin Plan and federal rules governing a specific parameter should be read carefully, since there can be site specific applications or exceptions.

2. Criteria developed by the U.S. Environmental Protection Agency, California Department of Fish, and the California Department of Health Services and other applicable criteria developed by government agencies. Such criteria will be used to interpret narrative water quality objectives.

3. Guidance or guidelines developed by agencies/entities such as the U.S. Food and Drug Administration, National Academy of Sciences, and the Agency for Toxic Substances and Disease Registry and the California Department of Health Services. Guidelines developed by other agencies should be thoroughly reviewed before applied, since the assumptions and risk factors considered may not be consistent with Regional Board water quality objectives.

4. Criteria or standards developed in other states, regions, or countries. Such criteria should be used with caution. The environmental setting, assumptions, and risk factors considered may not be consistent with Regional Board water quality objectives.

5. Findings in peer-reviewed literature, listing decisions made in similar settings within the State, and/or "weight of evidence" based on information and evaluations performed by outside agencies or groups. Generally, a more extensive description will be needed to justify the impairment (or lack of impairment) determination. Clear links should be described between the literature, findings in similar settings, or outside evaluations and the non-attainment of water quality objectives.

There are no specific minimum data requirements or a specific frequency of exceedance for making a finding that water quality objectives are not attained. In general, more data is needed to interpret environmental results that are very specific to time and geography. Less data would be needed to make a determination based on environmental results that serve as integrators over space or time. So more water column chemistry data would generally be needed to determine impairment than fish tissue chemistry data. Also less water column chemistry data may be needed to make an impairment determination (or lack of impairment determination) if there is other information to support the findings from the water column chemistry (e.g. correlations could be made between pesticide use patterns and the presence of pesticides in surface water).

D. Priority Ranking:

A priority ranking is required for listed waters to guide TMDL planning pursuant to 40 CFR 130.7. TMDLs will be ranked into high (H), medium (M), and low (L) 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 of impairment or threat (such as number of pollutants/stressors of concern, and number of beneficial uses impaired)
- conformity with related activities in the watershed (such as existence of watershed assessment, planning, pollution control, and remediation, or restoration efforts in the area)
- potential for beneficial use protection or recovery
- degree of public concern and involvement
- availability of funding and information to address the water quality problem

- overall need for an adequate pace of TMDL development for all listed waters
- other water bodies and pollutants have become a higher priority

It should be noted that the criteria could be applied in different ways to different water bodies and pollutants. For example, a water body may be severely impaired, but if there is little likelihood of beneficial use recovery than a lower priority might be given.

E. Weight of Evidence and 303 Listing:

In developing the 303 list we are mandated to evaluate all existing and readily available information. This carries with it the implication that readily available information is sufficient for determining if a water is impaired. This implication is not a directive, we could define a very rigorous threshold for determining impairment. However, it seems logical that the law would contemplate relying on the consideration of available information rather than a wholesale rejection of available information because it doesn't conform to a rigorous decision threshold. In other words, it is not necessary to have a comprehensive study with detailed statistical analysis of the magnitude, duration, and intensity of impact to beneficial uses to conclude that an impairment exists. In fact, a listing implies only that sufficient information exists to consider at least one point in the water body to have exceeded standards for at least one significant period of time. It does not mean the entire water body does not attain standards for all times.

In considering how to look at available information it is readily clear that no standardized set of information can be used as a determinant for listing. Any available information is to be considered. Therefore some means of bringing any type of information into the evaluation must be established. The typical description for this approach is a weight-of-evidence approach. In this method the evaluator weighs various pieces of information as to its ability to demonstrate a credible line of reasoning leading to a conclusion about the condition of the water. Three possible conclusion exist: 1) the water is not meeting standards, 2) it is meeting standards, or 3) we just can't tell.

F. Use Of 305(B) Guidance as the Basis for 303(D) Listing:

Numeric criteria consist of three parts: a chemical concentration, an averaging period, and an exceedance frequency. Typically our standards are stated as instantaneous maximum, hourly averages, 4-day averages, 30-day averages, monthly averages, or median values for a given period of time. An averaging period is involved in many samples. An average is a statistical metric of the population of data points and, by definition, is made up of values that lie above and below the stated value. The number of data points that fall above or below the average, and how far from the average a point may fall and still be considered part of the population that makes up the average, is not described by the average itself but by other measures such as the variance or standard deviation. We typically look at the distribution of the data and try to fit it to some form of standardized distribution. If the pattern of the data approximates a standard distribution we can use the standard mathematical and statistical methods available to analyze the information. We typically try to fit a normal distribution or log normal distribution to the available data, because many statistical methods have been developed to evaluate these distributions.

Several Regions have proposed using the methods recommended for the 1996 305(b) reporting process as the method of choice for evaluating your information. The 305(b) guidance relies on a quantile assessment of data to draw conclusions (the most commonly used quantile is the median). Specifically, the 1996 305(b) guidance is generally taken to recommend that when 10% of the data points fall above the numeric value of the criteria under consideration that the conclusion should be that the water is not attaining the water quality standard. This approach is also stated in the draft Consolidated Assessment and Listing Methodology (April 20, 2001). While this may be a useful rule of thumb, the quantile assessment method does not address the specific average stated in the standard or the frequency allowed for values exceeding the average (e.g. once every 3 years).

A typical data set for a water attaining standards will contain many values near or below the standard and relatively few values marking the extreme condition (the data are skewed, i.e. the distribution deviates from the standard normal distribution). If the extreme condition is a high flow event or above the usual value (the most common case) the extremes will act to pull the average up. If one compares the median to the mean in the common case, this implies the mean falls above the median. We can use this relationship in evaluating chemical data and information and as a basis for building the weight of evidence. However, unless we know the distribution of the data, we cannot conclude that when we have 10 % of our data above the mean we automatically have a condition of non-attainment.

Take for example the aquatic life protection criteria based on EPA methods. These values are 4-day averages not to be exceeded more than once every three years. We do not collect data that can be used to directly assess the 4-day average. Our sampling is typically grab samples, and is rarely collected on four consecutive days. A single grab sample cannot be used to evaluate the 4-day average. There is no way to determine the variability associated with the average or the sample from a single sample. However, the grab sample remains the best estimate of the 4-day average that we have. If we have a number of samples over a period of time we can evaluate the trend of these estimates. Over time, if the water is attaining standards, we would expect the mean of 4-day averages to approach the standard. That is to say the variability about a single mean estimate becomes insignificant and a determination of compliance with the standard can be reached. If we look to the relationship of the median to the mean we would expect the common circumstance of the mean above the median. If we find instead that the mean falls below the median we can assume the water is not behaving normally. If the mean of the samples also falls above the standard then we may assume we have a noncompliance situation. If we expect the common circumstance and find the mean above the median, then we would need to see a significant departure from the standard before we would be comfortable claiming impairment, unless we have a sufficient number of samples to statistically quantify the variance of the means (grab samples). If there is a large number of samples available we may be able to rely on statistical tests to show a condition of non-attainment when the mean is close to the median. This is because a small sample could easily be impacted by the variability inherent in the grab sample estimates or the mean itself. Since we have no way of evaluating this variability with a small sample size we should be cautious in claiming impairment where we see an expected pattern or condition.

For averaging periods where we have at least 3 samples within the averaging period we can make a direct estimate of variability and a more direct statistical analysis of conformity with the standard.

In most cases a small number of samples will not provide much assurance of the accuracy of the determination. In some cases even large number of samples will not yield conclusive statistical analyses. In these cases we look to supporting information. We depart from the single line of evidence and begin building an assessment based on indications from different types of data. There is not a prescribed approach to constructing the weight of evidence. But some simple rules of thumb may help. We typically look first at the most direct measure of the subject of the standard in question. For example, if this is a chemical concentration standard we look to chemistry information or if it is a narrative regarding aquatic community structure we look to bioassessment data. These data will provide an initial indication. We then look for other evidence that supports the indication. Are there land uses that have been associated with a problem indicated by the initial evaluation? Is there toxicity data to correspond to the chemical data? Are there official warnings or declarations of regulatory agencies that support the indication? Typically, unless we have a strongly compelling single line of evidence we will look to these multiple lines of information to bolster the decision. These lines of evidence can work to either support a listing or confirm that no listing is appropriate. Information such as photo monitoring is typically used as this type of ancillary information. In some cases quantitative photo monitoring techniques are used, and these can be treated as a single line of evidence.

The results of mathematical models that simulate water body conditions are typically looked at in light of a weight of evidence. That is, reliance on a model result alone is not usually used. Calibrated models add evidence that the model is accurately depicting water body conditions. Similarly, land use analysis typically requires additional information beyond simply the presence of a land use type that we have found to frequently be associated with water quality problems.

In many cases a clear conclusion will not be reached, either the information is not sufficient or it is contradictory and therefore no clear description of impairment is possible. For these waters we need to record this fact and identify these waters as a group. If the group is small when we are done listing we can pursue further assessment as resources allow. If a significant portion of the waters reviewed fall into this category then we must devise a programmatic response to addressing this information gap.

The rigor of the evidence used to recommend that a water be listed becomes a judgment decision of the Regional Boards and their staff. It must be kept in mind that a decision to list does not require the same certainty that is applied when determining violations of permit conditions. Constructing the list is not a regulatory action. It is an informational and administrative exercise that prioritizes our work and highlights problem locations. As such the judgment of staff is sufficient basis for listing. What is necessary is a reasonable rationale to support the listing or delisting, and documentation of the information relied on to reach that conclusion. The regulatory actions associated with listing come as a response to the list. TMDLs, standards actions, or other means of resolving the non-attainment condition are the regulatory instruments.

In summary, it is recommended that a weight of evidence approach be applied when developing the 303(d) list. Procedures recommended for 305(b) reporting are appropriately applied within the weight of evidence, but should not be relied on exclusively as the basis for determining non-attainment of a standard. This is because the 305(b) recommendations rely on a quantile assessment that does not consider the specific averaging and exceedance frequencies specified in standards. Where ample samples are available, statistical methods designed for standardized population distributions can be used to evaluate water quality conditions.

V. Regional Board 303(D) List Submittal Package:

1. Hard copy of 303(d) list of water bodies and/or watersheds. The list must include the pollutant or stressors, pollutant sources ("unknown" is an acceptable answer), extent of impairment (e.g. miles of stream, acres of estuary), TMDL priority ranking and schedule (Start and end dates for TMDL development). The ACCESS file for GeoWBS has a report that will generate a draft and final 2002 list.

2. Written summary of the overall considerations for listings, de-listings and priority setting.

3. Summary of rationale used to list or de-list specific water bodies and a summary for each request for listing or de-listing that were considered, but not recommended. Also, a summary of how each listing was prioritized. We strongly request this information in the form of fact sheets (like the templates distributed by region 5). Include rationale for

changes made due to public comment or Board input. THIS IS ONLY FOR NEW LITINGS OR DELISTINGS—NOT THE 1998 LISTINGS.

4. An electronic copy of the GeoWBS data files (the Geowbs.mdb and zipped Geodata files) that contain the above information.

5. Copy of electronic data received for this listing. These data should be stored on the Regional and State Board shared drive, organized by water body and listed in a summary table.

6. Copies of data received for this listing cycle, in hard copy format. These data should be organized by water body and listed in a summary table.

7. Documentation of the public participation process

   a. Description of public process (i.e., Was it taken to Board and how)
   b. Public solicitiation letter(s), Public notice(s)and length of notice period
   c. Public Comments
   d. Responses to comments
   e. Board decisions
   f. Copy of transcripts of public workshops or meetings.

8. Copies of all staff reports, letters, memorandums, resolutions, etc. which were part of the listing process.

9. Copies of all draft proposed 303d lists for public review.

10. Summary table stating number of new listings and number of delistings.

11. Location of RWQCB file(s), which contain the individual water, body assessment data, information, etc. upon which the listing decision was made.

VI. Regional Board 303(D) List Submittal Schedule:

- Public Participation Schedule: August 31st
- Written summary of the overall considerations for listings, de-listings and priority setting: August 31st
- Other documentation: October 15th

State Board staff will ask the regions to submit their lists and supporting documentation by October to meet the requirement of a staff report by December. A couple of regions have already said they can't make that deadline. Unfortunately, that will still need to remain the State Board deadline. In those cases where the regions will not have taken their lists to their boards, they will still have staff reports by October. I will ask that they submit their staff reports and supporting documentation by then, and if their boards want changes in January the individual regions can submit those changes as comments to the State Board staff report. Also, it is not required that any lists be approved by Regional Boards--that decision is up to each region.

VII. Public Participation:

A number of stakeholders have requested greater consistency among the Regions in their public participation. We need to establish some baseline for public participation

Question: #1

How much information was submitted to your Region for evaluation for the upcoming 2002 TMDL submittal? (We do not need a precise count, but a feel for how much information you are reviewing. For example, 4 boxes of reports or about fifty individual submittals).

Response from individual Region

Region and (Staff Responding)	
R-1 (Matt St.John)	Total of 55 individual submittals. Approximately 1/4 of these are letters with references to reports, but no quantitative data. Approximately ½ contain monitoring data. One submittal contains 4 boxes worth of materials. Two other submittals contain 1 full box of materials.
R-2 (Steve Moore)	17 submittals including data, requests to list, requests to de-list. See attached Excel spreadsheet. Requests to list are mostly from Water keeper (formerly Bay keeper). Requests to de-list are from dischargers (BAASMA). Individual water districts are sending data only with no requests to list or delist.
R-3 (Lisa McCann)	10 responses with either electronic data files or reports
R-4 (Jonathan Bishop)	We received 35 individual submittals, ranging from private citizens submitting photographs of trash, scum, etc. to major POTWs. Certainly the majority of submittals are from major NPDES dischargers. However, we also received large submittals from two citizen-monitoring groups, county health departments and some lake associations. We are also attempting to compile and import into our database system, all receiving water data from major POTWs, whether or not they submitted a comprehensive package in response to our data solicitation.
R-5 (Joe Karkoski)	
R-6 (Judith Unsicker)	Under 10 letters/emails; 2 detailed data sets. (Have not uploaded data onto network yet.) Have an additional recent in-house data set intend to look through in-office reports/files to extent time permits.
R-7 (Teresa Newkirk)	10 responses, including some with little information other than the name of a contact person, a few data spreadsheets (i.e. NAWQA, Bureau of Reclamation). Region has its own data to evaluate-still waiting on data reports for some. Did not receive an overwhelming amount of information. No requests for listing or delisting.
R-8 (Pavlova Vitale)	5 responses with electronic data files and reports

R-9 (Keri Cole)	Region 9 has approximately 40 different submittals (in-house and external) of data to review. These include: Planning studies, Survey Assessments, Monitoring Reports, NPDES Compliance Data, Storm water Permit Compliance Reports, Health Care Agency Beach Closures, City of San Diego Monitoring Reports, USGS Monitoring, Discharge Monitoring Reports, Citizen-submitted Packages, modeling studies, photographs, Benthic Community Assessments, Toxic Substance Monitoring Program and other miscellaneous sources of data. Public solicitation notices were mailed and advertised in local newspapers on 7 Mar 01 and Public Workshops were held on 4 April 01 and 3 May 01. We are only reviewing data generated since July 1997 and received in our office by 15 May 01.
Summary	

Question: #2

Can you make any estimates about the number of new listings or delistings you are anticipating? (Your best "guesstimate" is a sufficient answer).

Response from individual Region

Region and (Staff Responding)	
R-1 (Matt St. John)	A rough guesstimate is that we may make recommendations for 10 to 15 new listings. We do not plan to make any de-listing recommendations.
R-2 (Steve Moore)	10 new listings (many for coliform, based on data from creeks that run across beaches-mostly in San Mateo County), 2 delistings (Cu and Ni for SF Bay, south of Dumbarton Bridge only). All current "diazinon" listings will be changed to "Pesticide toxicity".
R-3 (Lisa McCann)	65 listings, 3 delistings
R-4 (Jonathan Bishop)	I can't. I suspect there will be additional listings (for aesthetic stressors - trash, for example - and for sedimentation) and perhaps others for priority pollutants. There may be some delistings, if new data are available.
R-5 (Joe Karkoski)	
R-6 (Judith Unsicker)	Plan to delist at least 19-20 waters. No estimate on new listings.
R-7 (Teresa Newkirk)	Too soon to say for sure, but are not expecting major changes.
R-8 (Pavlova Vitale)	Possibly 6 new listings and no delistings at this time
R-9 (Keri Cole)	Our best guesstimate (emphasizing guess) is 5 - 8 new listings and no delistings.
Summary	

Question: #3

What process are you using to evaluate your new information? (If you have a written summary of the process, can you forward a copy)?

Response from individual Region

Region and (Staff Responding)	
R-1 (Matt St. John)	Weight of evidence approach. Also will use "fact sheet" (per Joe Karkoski) to document recommendation. Written summary on evaluation process will be in our Staff Report.
R-2 (Steve Moore)	Only accepting data generated since 1997; using specific Basin Plan objectives; 305(b) guidance; exceedance frequencies from USEPA and CTR; weight of evidence approach and BPJ. NOTE: This Region wants to add a threatened category to their list. Would really like guidance from SWRCB on this
R-3 (Lisa McCann)	Weight-of-evidence per program and roundtable discussions- written summary will be in staff report but not written yet.
R-4 (Jonathan Bishop)	Our plan is to follow EPA guidance for conducting 305(b) assessments. We will update this as necessary. See attached for a summary of our 1996 assessment guidelines, also based on EPA's guidance.
R-5 (Joe Karkoski)	
R-6 (Judith Unsicker)	No formal process. Expect to compare quantitative data with standards, take notes on potential listings, and discuss with management.
R-7 (Teresa Newkirk)	Primarily using specific Basin Plan objectives; some parts of 1998 guidance; weight of evidence approach and BPJ.
R-8 (Pavlova Vitale)	The first part of the process is to answer the question of Does the data not meet the objective 95% of the time? In other words does it meet the objective 15% of the time? If the answer is yes then it is separated into a does not meet objectives category and then it is listed as impaired. If it does meet the objective more than 15% of the time, then it is separated into the it meets the objective category. For the ones on the meets the objective category then we ask the question, how close to the objective are they? The possible answers here are it is right on the dot at the numerical objective (we don't have any that would fit this scenario) or it is less than the objective but within 2 standard deviation points from the mean or it is less than the objective but more than 2 standard deviations from the mean. Then for the ones that are within 2 standard deviations from the mean then we will try to get funds for us to do more focused monitoring and for the ones that are further away from 2 standard deviations from the mean, will have to wait until the next monitoring assessment funding comes up for us to obtain more data. Give me a call about this particular item if you would like more clarification. We are trying to go through this process for the dry and wet seasons.

R-9 (Keri Cole)	Please see attached file: Region 9's 2002 CWA Section 303(d). This model is based upon the listing criteria as delineated by Joe Karkoski (R5WQCB).
Summary	

Question: #4

What type of data quality evaluations are you conducting?

Response from individual Region

Region and (Staff Responding)	
R-1 (Matt St. John)	We are using the data quality criteria as presented in the Public Solicitation of Water Quality Information notice. We are not doing any statistical analyses on the data. However, we are reviewing the sampling procedures and laboratory QC procedures and results.
R-2 (Steve Moore)	Are still in the process of organizing data to evaluate. Will not be QA'ing data from USGS or similar agency data. Will evaluate citizen monitoring data submissions by looking at QA Plans, SOP's with telephone follow-up if necessary.
R-3 (Lisa McCann)	Using what we consider "reliable" and "quality" based on who did collection and analysis and whether they appeared to follow protocols; only considering other sources where our ambient monitoring program data corroborates info/data from these less reliable sources.
R-4 (Jonathan Bishop)	For monitoring data, we asked agencies to submit a copy of their QAPP. These will be reviewed and the data will be screened accordingly.
R-5 (Joe Karkoski)	
R-6 (Judith Unsicker)	Detailed data sets are from agencies with accepted QA/QC procedures
R-7 (Teresa Newkirk)	Are still in the process of organizing data to evaluate. Will not be QA'ing data from USGS or similar agency data. Did not receive any citizen monitoring data. Will use own QAPPs for Regional Board data.
R-8 (Pavlova Vitale)	At this time we are taking the data on its face value that is why we would only list if 95% of the data does not meet the objective. That takes into account the times when we only get a few data points for the receiving water body.
R-9 (Keri Cole)	Region 9 has approximately 40 different submittals (in-house and external) of data to review. These include: Planning studies, Survey Assessments, Monitoring Reports, NPDES Compliance Data, Storm water Permit Compliance Reports, Health Care Agency Beach Closures, City of San Diego Monitoring Reports, USGS Monitoring, Discharge Monitoring Reports, Citizen-submitted Packages, modeling studies, photographs, Benthic Community Assessments, Toxic Substance Monitoring Program and other miscellaneous sources of data. Public solicitation notices were mailed and advertised in local newspapers on 7 Mar 01 and Public Workshops were held on 4 April 01 and 3 May 01. We are only reviewing data generated since July 1997 and received in our office by 15 May 01.

Summary	

Question: #5

Are you compiling all data in some sort of database?

Response from individual Region

Region and (Staff Responding)	
R-1 (Matt St. John)	The information relevant to the list update will be included in GeoWaterbodies.
R-2 (Steve Moore)	Summaries of submissions are in the attached Excel spreadsheet. Actual data are in various electronic spreadsheets. For new listings or controversial water bodies only, data will be put into a database (GeoWBS?). Region would like some guidance from SB on this. GeoWBS is currently being worked on by a student, but is not getting much attention
R-3 (Lisa McCann)	"Reliable" data being compiled in our Central Coast Ambient Monitoring Program database, less reliable data not being entered into a databases just collating reports and files.
R-4 (Jonathan Bishop)	Yes, and it is an enormous task. We are compiling all water chemistry and bacteriological data into MARS (Monitoring and Reporting System), which is a component of SWIM. We are far from being done with this first step. We hope to be finished by the end of the month, though that is probably overly optimistic.
R-5 (Joe Karkoski)	
R-6 (Judith Unsicker)	NO.
R-7 (Teresa Newkirk)	Have not decided yet. Will probably use GeoWBS.
R-8 (Pavlova Vitale)	At this time we are not compiling the data into a database. I am using the data from the disks that were provided to us. Sometime in the future we will enter the data into access and ultimately into Storet but at this time we are using our efforts on just getting the assessment done. We are using minitab as our stat package.
R-9 (Keri Cole)	Initially, we have created an excel database to catalogue all incoming data for waterbody affected, narrative location, document title, date received, dates of sampling, and contact person. Eventually, all data will be input to the Statewide (SWRCB) Geo Water Body System Database (GeoWBS).
Summary	

Question #6

Are you preparing water body fact sheets or some other written summary for each listing?

Response from individual Region

Region and (Staff Responding)	
R-1 (Matt St. John)	Yes, we are using the fact sheets.
R-2 (Steve Moore)	All information will be compiled in one large staff report. The exact report structure has not been identified yet, but it will be a logical format such as by county, or by pollutant. RB has fact sheets for most existing listings.
R-3 (Lisa McCann)	Staff report will include attachments with written summaries for most of the listings (some groupings may emerge).
R-4 (Jonathan Bishop)	I will most likely create a data summary table, similar to the one we developed in 1996 to summarize our assessment (see attached).
R-5 (Joe Karkoski)	
R-6 (Judith Unsicker)	Expect to summarize justification in a staff report.
R-7 (Teresa Newkirk)	Possibly, but too soon to know. Do not have factsheets for old list. No staff who worked on previous lists is still at the Region.
R-8 (Pavlova Vitale)	We will be preparing fact sheets for the water bodies assessed. However, I am leaving that to the end. We have some fact sheets that we put together in house to help in the analyses of the data which will help in preparing the factsheets for the assessment.
R-9 (Keri Cole)	Water body fact sheets are being prepared and are part of the attached file: Region 9's 2002 CWA Section 303(d). Again, this is modeled after the efforts of Joe Karkoski (R5WQCB).
Summary	

Question: #7

Where are you at the process of evaluating new information? (Your best "guesstimate" is a sufficient answer.)

Response from individual Region

Region and (Staff Responding)	
R-1 (Matt St. John)	We have done an initial review of all of the submittals, and are in the early stages of doing more in-depth reviews. We anticipate 2-months of staff time to complete the reviews and recommendations; perhaps an additional 2 weeks to complete GeoWaterbodies.
R-2 (Steve Moore)	BAASMA agencies and a meeting with them are schedule for July 11. Main pollutants addressed in submissions are coliform, sediment and trash. Some information submitted on toxic pollutants in storm water, but this was addressed in Currently filtering through submissions. Much information was submitted by 1998 listing. Four-day average concentrations are necessary, but storms do not usually last 4 days in the Bay Area. Delisting- Copper and Nickel in the Bay (south of the Dumbarton Bridge only) will be delisted on the basis of new studies. North Bay will still be listed.
R-3 (Lisa McCann)	75% done.
R-4 (Jonathan Bishop)	Still converting and importing data into MARS, and evaluating appropriate assessment guidelines. No data analysis has been started.
R-5 (Joe Karkoski)	
R-6 (Judith Unsicker)	Just starting
R-7 (Teresa Newkirk)	Just starting but anticipate moving quickly.
R-8 (Pavlova Vitale)	We are 3/4 of the way done.. I have yet to evaluate the rainy season data and that are taking a long time to crank through.
R-9 (Keri Cole)	We have only recently developed our internal guidelines (see attached) and are still editing this document. Beginning 25 June, individual staff members will start in-depth review of the data, determine which data can be used and make recommendations for list additions or removals. We plan to have draft recommendations by early August.
Summary	

Question: #8

What criteria or considerations are you using to decide whether to list the water body?

Response from individual Region

Region and (Staff Responding)	
R-1 (Matt St. John)	1998 Listing factors. Weight of evidence approach, coupled with assessment of water quality objectives and thresholds as defined in appropriate literature.
R-2 (Steve Moore)	Data must be current (1997 or later); using specific Basin Plan objectives; 305(b) guidance; exceedance frequencies from USEPA and CTR; fish tissue data; weight of evidence approach and BPJ
R-3 (Lisa McCann)	1998 listing criteria but insisting on reliable data to support them.
R-4 (Jonathan Bishop)	See 1996 water quality assessment
R-5 (Joe Karkoski)	
R-6 (Judith Unsicker)	Need to discuss potential considerations with Region 6 management and get direction/approval. Plan to delist waters currently listed for impairment entirely from natural sources (geothermal springs with high arsenic, etc.) and for impairment due to flow alteration. Would prefer to delist/not list waters impaired by "pollution" rather than "pollutants" as defined in the Clean Water Act. Considerations for discussion with management include role of non-degradation; numbers of samples needed to justify listing, etc. Do we list all waters where boat fuel chemicals have been detected, waters where pesticides from atmospheric deposition have been detected, etc.? Do we list waters where the TSMP has detected chemicals in fish flesh exceeding consumption criteria even though TSMP samples are small and not statistically meaningful?
R-7 (Teresa Newkirk)	Need to finish looking at submissions. See answer to question 3.
R-8 (Pavlova Vitale)	Criteria for listing the water body are based on meeting numerical objectives and standards in the absence of numerical objectives.
R-9 (Keri Cole)	Priority rankings will be based upon water body significance, degree of impairment, existence of other efforts in the waterbody to restore beneficial uses, potential for beneficial use recovery, degree of public concern, and the availability of funding and data. Please see attached file for further clarification.
Summary	

Question: #9

What criteria or considerations are you using to determine priorities for listings?

Response from individual Region

Region and (Staff Responding)	
R-1 (Matt St. John)	Our schedule priorities are largely dictated by our Consent Decree. Therefore any new listings would be weighted based on our current commitments. With this in mind we are using the 1998 prioritization criteria.
R-2 (Steve Moore)	Degree of environmental threat, intensity of use, significance of water body, and if there is a control program currently in place (all of equal importance in setting priorities).
R-3 (Lisa McCann)	198 prioritization criteria
R-4 (Jonathan Bishop)	I'll need to get back to you on this.
R-5 (Joe Karkoski)	
R-6 (Judith Unsicker)	Do you mean priorities for TMDL development for newly listed waters? Considerations will probably include resource value and relative magnitude of problem. Given high resource value of most Region 6 waters, most currently listed waters are rated "high" priority on a high-medium-low scale, and this will probably be the case for newly listed waters. TMDL scheduling for newly listed waters will include consideration of needs for additional data collection, relative difficulty of developing TMDLs and implementation programs (e.g., watershed size, number of sources, legacy pollutants and atmospheric deposition sources, etc.)
R-7 (Teresa Newkirk)	Still a bit too soon, but will probably use degree of environmental threat, intensity of use, significance of water body
R-8 (Pavlova Vitale)	I will have to defer to Hope Smythe on this one.
R-9 (Keri Cole)	Priority rankings will be based upon water body significance, degree of impairment, existence of other efforts in the waterbody to restore beneficial uses, potential for beneficial use recovery, degree of public concern, and the availability of funding and data. Please see attached file for further clarification.
Summary	

Question: #10

What is your schedule for evaluating information? (This should include any staff reports, public participation steps or Board meetings, and when you plan to submit information to the State Board.)

Response from individual Region

Region and (Staff Responding)	
R-1 (Matt St. John)	We plan to complete our staff report by October, so that we can deliver our materials to State Board in October, and do Regional Board presentation in the same month. Per our Board's direction, we will not have public workshops on the recommended list update.
R-2 (Steve Moore)	Draft Staff Report will be completed by the end of July. This will include a compilation of fact sheets and references. There will be a 30-day public comment period following the release of the staff report. There will be a Board meeting in September. Submittal to the State Board will follow this meeting. Stakeholder process includes a monthly meeting with BAASMA and meetings with individual water agencies and with Water keeper. There will not be an extensive peer review process, although the Region will work some with SFEI.
R-3 (Lisa McCann)	Staff report will go out for public comment with recommendation end of August, Board Hearing in October.
R-4 (Jonathan Bishop)	July: Data conversion and evaluation of assessment guidelines (We have solicited public comments on our assessment guidelines and will be evaluating our guidelines over the next month.) August-September: Continue data conversion as necessary, conduct assessment of water bodies October: Take information item to Regional Board, or simply submit recommendations to State Board.
R-5 (Joe Karkoski)	
R-6 (Judith Unsicker)	Evaluate information and discuss/agree on listing/delisting criteria with Region 6 management- July Draft staff report to management- early-mid August Staff report released- late August-mid September Board workshop/hearing- October meeting Board action –mid November workshop/hearing Complete and submit administrative record to SWRCB- mid December.
R-7 (Teresa Newkirk)	Don't know yet, but anticipate October Board meeting. Format may be staff report, informational item. Will know more by July 6.
R-8 (Pavlova Vitale)	We are shooting for the September board meeting to have the board approve the list.

R-9 (Keri Cole)	25 June evaluation early Aug Mid Aug Mid Aug Sept-Oct to Oct Mtg. R9 End of Oct	Data distributed to staff for in-depth review and Complete internal draft recommendations for listing / delisting Post Draft listing update for public scrutiny Conduct Public Workshop? End of 30-day public review / comment period. Respond Public comments Finalize recommendations, Present listing / delisting to Board Present Recommendations to SWRCB
Summary		

Question: #11

What role will your Board play? Will your Board formally approve the list, or will it be presented as an information item?

Response from individual Region

Region and (Staff Responding)	
R-1 (Matt St. John)	Our Board has indicated it will simply hear the staff report as in informational item, and will not formally approve the staff recommended list.
R-2 (Steve Moore)	Board will write a resolution of transmittal of the list to the SWRCB for the SFRWQCB. The list will not be formally adopted, but it will be more than an information item.
R-3 (Lisa McCann)	Approve as a recommendation before sending to State Board
R-4 (Jonathan Bishop)	Probably an information item.
R-5 (Joe Karkoski)	
R-6 (Judith Unsicker)	Planned workshop(s) or hearing(s) with Board adoption of recommendations.
R-7 (Teresa Newkirk)	Don't know yet. Probably information items.
R-8 (Pavlova Vitale)	We are shooting for the September board meeting to have the board approve the list.
R-9 (Keri Cole)	We anticipate the recommendations will be presented to the Board as an informational item at the October Board Meeting. The R9 Board is not expected to take a formal action on the recommended listings.
Summary	

Question: #12

The TMDL roundtable has asked DWQ staff to arrange 11 focus groups to meet and discuss listing considerations for specific parameters. It was envisioned that this would have already occurred. Would these meetings still be useful if they were scheduled in mid-July?

Response from individual Region

Region and (Staff Responding)	
R-1 (Matt St. John)	Which parameters are you most interested in discussing? Specific parameters include: sediment, bioaccumulative substances, pathogens, pesticides, metals, other organic compounds, temperature, habitat and toxicity, nutrients, and "trash, settable solids & scum:. -Sediment, temperature, and nutrients are most relevant for our region. These meetings would still be useful, but realistically may not be considered for this update cycle.
R-2 (Steve Moore)	It's too late for meetings at this point. Regional Board staff will contact appropriate staff at other regions or at the State Board for consultation as necessary
R-3 (Lisa McCann)	These meetings would be too late for us if scheduled in July but it would be very helpful to have the lists so staff from my region can contact staff from other regions working on same parameters and issues. Please send on!
R-4 (Jonathan Bishop)	Yes, they would be useful. I would be most interested in pathogens, bioaccumulatives, habitat (sedimentation), nutrients, and trash, etc. But, would hope to benefit from all discussions. Hope these responses help. If there is any way for you to facilitate sharing analytical tools (such as database formats, statistical methods, etc.), among Regional Boards, that would be great. This is a monumental task and we have very limited resources to do it.
R-5 (Joe Karkoski)	
R-6 (Judith Unsicker)	Discussions in July would be useful, but based on previous experience, I doubt that final agreement on listing considerations can be reached in time to meet schedules for completing/releasing public reports. I am most interested in discussing bio-accumulative substances/habitat and toxicity
R-7 (Teresa Newkirk)	It's too late for meetings at this point. Email discussion groups would be most helpful.
R-8 (Pavlova Vitale)	It would be kind of late for us to have the meetings in July but I would imagine that we might be able to make some use of the information from the meetings. I think it would be late because for us I need to have it done by mid July and then have it peered reviewed in-house and also have it peered review by a couple of other outside parties and then it would go for public comment in August for consideration in September.

R-9 (Keri Cole)	At this point, it seems too late for focus groups to get together to discuss issues and form any consensus regarding criteria. An e-mail forum might be best to share solutions or solicit advice concerning each groups focus. Will you be the contact for broader issues such as documentation requirements, deadlines, questions of time and space inherent to all data sets, etc.?
Summary	

Regional Board Program Structure

Response from individual Region

Region and (Staff Responding)	
R-1 (Matt St. John)	The North Coast Regional Water Quality Control Board recently reorganized in November 2000 to add a new TMDL Development Unit. This TMDL unit is organized by watershed and has 7 TMDL staff including the unit chief. Staff is assigned to TMDLs in the Gualala, Mattole, and Klamath watersheds. One staff person is dedicated to GIS support and Data Management. The unit supports other units whose work links closely to TMDL development, including Monitoring and Assessment and Basin Planning Units. Staff resources assigned to TMDL development have increased by about 40% in the last year
R-2 (Steve Moore)	The San Francisco Bay Regional Water Quality Control Board contains a TMDL Section within its Watershed Division, with 8 dedicated staff, including the Section Leader. Staff and program resources are organized by TMDL projects within a particular watershed and/or grouped by pollutant categories to maximize certain water quality expertise, (e. g., mercury, and sediment). Staffs from other units participate as needed from the Planning and Policy and Watershed Divisions. Staff resources have increased approximately XX% in the last year.

R-3 (Lisa McCann)	The Central Coast Regional Water Quality Control Board contains a TMDL Unit within its Watershed Branch- containing eight dedicated staff and a unit supervisor. Staff and program resources are organized by TMDL projects within a particular watershed and/or grouped by pollutant categories to maximize certain water quality expertise. One of the eight staff provides GIS support and data management. TMDL efforts are closely coordinated with staff in other units implementing pollution control activities, monitoring and assessment and basin planning. The program has increased in staff resources 60% in the last year. Contain a TMDL Unit within the Watershed Branch containing 9 dedicated staff. Staff and program resources are organized by watershed, and TMDL efforts utilize staff from all Watershed units as needed. The program has increased in staff resources 60% in the last year.
R-4 (Jonathan Bishop)	The Los Angeles Regional Water Quality Control Board contains two units, and is organized on a watershed basis. The Region has committed to an aggressive schedule to complete 92 TMDLs within 13 years. U.S. EPA approved the Region's first TMDL in December 2000. On January 25, 2001, the Regional Board adopted the Los Angeles River Trash TMDL. The units are presently working on developing eight TMDLs, addressing trash, chloride, pathogens, and nutrients. In addition, the TMDL Units work closely with the Storm water and Nonpoint Source Units in TMDL implementation issues. To address the current workload, Region 4 has increased staffing by approximately 150% during the past year.
R-5 (Joe Karkoski)	The Central Valley Regional Water Quality Control Board has 3 TMDL Units within two watershed sections - the San Joaquin River Watershed Section and the Sacramento River Watershed Section. The San Joaquin section contains one TMDL unit and the Sacramento River Watershed section has two TMDL units. TMDL efforts utilize staff resource from other units in the watershed sections involving nonpoint source issues, the Sacramento River Watershed Program, monitoring, and agricultural and regulatory issues, involving approximately 20 staff in TMDL Development.
R-6 (Judith Unsicker)	The Lahontan Regional Board (South Lake Tahoe and Victorville offices) has one TMDL program containing 6 dedicated staff, plus one TMDL advisor. The program is organized by watershed. TMDL efforts involve staff resources of all watershed and planning units. Staffing has increased by XX% in the last year.
R-7 (Teresa Newkirk)	The Colorado River Basin Regional Water Quality Control Board contains two units that work on TMDLs: a TMDL Development Unit and a TMDL/NPS Implementation Unit. The units include 12 dedicated TMDL staff. Additionally TMDL efforts involve staff from basin planning. Staff resources have increased by approximately XX% in the last year to address a growing work demand.
R-8 (Pavlova Vitale)	The Santa Ana Regional Water Quality Control Board has a TMDL Program Manager and staff from 3 different units (Planning, and the Santa Ana and Coastal Watershed Units) dedicated to TMDLs. At present, 13 staff works on TMDLs. Staff resources have increased approximately XX% in the last year to address the growing work demand.

R-9 (Keri Cole)	The San Diego Regional Water Quality Control Board addresses its TMDL effort predominately within its Water Quality Standards Unit. Staff here is dedicated to basin planning, water quality assessment and TMDL development. Approximately 11 staff work on TMDLs. The workload of the last year has led to a staff increase of XX%.
Summary	

From: Valerie Connor
To: Cole, Keri
Date: 7/26/01 8:40AM
Subject: Re: 303d & 305b

If your region is submitting something like the fact sheets that St Bd staff have requested, then we can be more flexible in getting the 305 b stuff. There are several regions that are resisting fact sheets and then we will need their info. in GeoWBS to be able to produce basic fact sheets. We will definitely discuss this at the roundtable on Monday. Does this help at all?

Valerie Connor
Water Quality Assessment Unit
State Water Resources Control Board
1001 I Street Sacramento, CA 95814
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phone: (916) 341-5573
fax: (916)-5550
connv@swrcb.ca.gov

>>> Keri Cole 07/26/01 07:25AM >>>
Hi Valerie
I assume this will be discussed at the roundtable next week, but just trying to get a little clarification on the 305b assessment submittal. Is the SWRCB expecting that the 305b assessment be completed and submitted by the Regions to the State Board along with the 303d information in October? It was my understanding that the 303d recommendation submittal was the **priority** with the rest of the assessment info in the form of 305b info following close behind (Dec-Jan). Obviously information/assessments are useful for both and info falls out for both, but we need clarifications on deadlines and your expectations. It was also suggested that the info that is to be inputted in the GeoWBS system for both 303d and 305b could be done after submittal of 303d recommendations to you - immediately after - but not required with our submittal of 303d recommendations to you. Is this correct?

Could you get back to us on this at your earliest convenience? Thanks in advance for your assistance.

Respectfully,
Keri

p.s. FYI - My last day with the SDRWQCB will be 8/15/01. Until then I will be working on the 303d/305b for our region along with Jimmy Smith, who will be taking over the lead after my departure. Would you please add him to your mailing list, smitj@rb9.swrcb.ca.gov?

Keri Martinez, P.E.
Water Resource Control Engineer
San Diego RWQCB
9771 Clairemont Mesa Blvd., Suite A

From: Keri Cole
To: Brian Kelley; John Phillips
Date: 7/20/01 10:26AM
Subject: Monitoring Data

Hi Brian and John
Linda Pardy has asked Jimmy Smith and I to summarize ALL the sources of monitoring data that the Regional Board collects/review/requires in both San Juan and Otay HUs (i.e. POTW dischargers, industrial dischargers, storm water, special studies, etc....) Since you guys are the experts, can you help us identify the dischargers and reports in these two HUs or point us to who in your groups do? Is there a master list somewhere?

Thanks in advance for your help!

Keri

Another question Brian, does Vista Irrigation District submit monitoring reports to us? Again where could I find this info?

CC: James Smith

From: Keri Cole
To: James Smith
Date: 7/18/01 8:16AM
Subject: Re: Fwd: Fw: 305b/303d Workshops

looks good, made few editorial changes.

>>> James Smith 07/16/01 11:41AM >>>
Hi Kris,

A few changes in our schedule have occurred since my email sent to you on 3 July 01. We are still reviewing, evaluating and verifying the collected data. Given the variability in the type and organization of the data submitted and collected, this is a time-consuming process and we are trying to give this as much attention, evaluation, scrutiny and care as possible Thus, and in addition to meeting deadlines issued by the State Board (submittal in October), it is still uncertain as to what forum we will be presenting our draft recommendations to the public. Though not required, we still hope to hold an informal public workshop, but it may not occur in the remaining time period. Certainly at a minimum, the draft list will be made available for public review. Again, though not required, we intend to make every effort to respond to any comments we receive and resolve issues locally before sending the recommendations to the State Board. I reiterate that it is the SWRCB that will be conducting the official public hearings and comment period.

I hope this clarifies the process. Your name has been added to our mailing list per your original request and SCAP will be apprized of all upcoming events regarding 305b and 303d.

Thank you for your interest,
- jimmy

J. Smith
Environmental Specialist
Region 9 Water Quality Control Board
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(858) 467-2732
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From: Keri Cole
To: 303d Team
Date: 7/16/01 9:56AM
Subject: Re: a little help

the basin plan contains a narrative wq objective for suspended solids, no numerical values.

there is a secondary MCL (not listed in our Basin Plan) for EC at 900umhos/cm

also look at it as it relates to TDS (e.g. estimation on relationship with TDS mg/L = 640 * ECmmhos/cm).

thoughts with respect to TKN, since there is no criteria for TKN and it only includes organic N and NH3, you'd need to add nitrites and nitrates to get a total N in order to look at N:P ratio as defined in our basin plan....Lisa and Greig may have a better feel for this.

i am pretty sure there are no CaCO3 or o-phos standards

anyone else have thoughts?

>>> James Smith 07/13/01 04:11PM >>>
anyone find wqs for hardness, vss, tss, o-phosphate, T.K. Nitrogen and EC?

thanks,
-jimmy

J. Smith
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CC: Greig Peters

JB | CHRISTINA

LAT | LON

SHORELINE MI | IMPAIRMENT

303 (d) Staff Meeting
11 July 01

- Status Reports from each member (group)

KEN SCHIFF

- Technical Issues (Jimmy)

LP

Toxic Substance Monitoring Program

toxicity vs. organic

tissue conc → WQ conc.

metals / pesticides

be careful @ review

liver

whole fish

EDL

Weight of Evidence

include chlor

detection

Beneficial Use Impairment

rec1 / rec2

warm / wild

Data set approach vs Watershed Approach

CV / Moreno

tox sed water column

Existing List Review

De-listing?

video? picture?

Permits, Enforcement Actions, Proposed projects

- Expectations for 20 July (Keri / Jimmy)

- Draconian Deadlines (Keri / Jimmy)

KO — 35%

KC — 0%
LB — 0%

① TSMP data

Sweetwater

fish tissue data / metals

median nat'l stds.

FDA levels
Concentrations → WQ stds.

② old data < 7/97

③ Baykeeper letter
photos → little documentation associated w
→ no compelling

JS 10%

Aliso Creek WS

AM
SLR WS
100% review
summary sheet guidance → ready to write

30% w: SD River

BMI — good to look @ but not conclusive

From: Nancy Richard
To: Linda Pardy
Date: 7/10/01 11:31AM
Subject: Re: 303(d) shape file

Hi Linda,

Yes, it is at SWRCB home page. Under your Region, he can download a GIS zipped file. It contains several themes including 303(d) water bodies. If he doesn't find what he is looking for, he can call me. You also have these files on your computer in your GIS lab. Look under the directory "geowbs" and under the subdirectory "geodata". All the shapefiles for your region are in the geodata subdirectory.

Here is our website address for the GIS files:

http://www.swrcb.ca.gov/tmdl/downloads.html

Nancy

Linda Pardy 07/10/01 11:25AM >>>
James, Mike Cline at 619 533-4016 of the City of San Diego was looking for a GIS shape file for R9. Where's the best place to find this easily? Do we have it on the internet? -Linda

><> ><> ><> ><> ><> ><> ><> ><> ><> ><>
Linda Pardy, Environmental Specialist
California Regional Water Quality Control Board
San Diego Region
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Primary Office Phone Number (858) 467-2952
><> ><> ><> ><> ><> ><> >>>: ><> >>>:

Please take time to fill out our electronic customer service survey at: http://www.arb.ca.gov/calepa/cepacsur.htm

The energy challenge facing California is real. Every Californian needs to take immediate action to reduce energy consumption. For a list of simple ways to reduce demand and cut your energy costs, see the tips at: http://www.swrcb.ca.gov/news/echallenge.html

From: Stefan Lorenzato
To: DeShazo, Renee
Date: 7/3/01 11:37AM
Subject: email version of listing comment

Renee,
Attached is the email version of the comment I faxed. I corrected a couple of typo's in this version e.g. put you in as the addressee and the date in the headers. Otherwise it is what I sent. I will put the hard copy in the mail today.

Stefan

Stefan Lorenzato
TMDL Coordinator
Division of Water Quality
State Water Resources Control Board
P.O. Box 944213
Sacramento, CA 94244-2130
ph: 916/341-5525
fax: 916/341-5463
fax: 916-657-2388 Calnet 8-437-2388
email: lores@dwq.swrcb.ca.gov

CC: Ali, Syed; Barksdale, Pamela; Beaulaurier, Diane; Becker, Melinda; Bishop, Jonathan ; Connor, Valerie; Curtis, Chuck; Frantz, Greg; Grober, Les; Gwynne, Bruce; Jayne, Deborah; Karkoski, Joe; Kassel, Jim; Leland, David; Levy, Michael; McCann, Lisa; McClure, Daniel; Monji, Alan; Mumley, Thomas; Newkirk, Teresa; Rao, Linda; Richard, Nancy; Smythe, Hope; Unsicker, Judith; Wilson, Craig J.

Winston H. Hickox
Secretary for Environmental Protection

Gray Davis
Governor

June 30, 2001

Renee DeShazo
Regional Water Quality Control Board
Los Angeles Region
320 W. 4th Street, Suite 200
Los Angeles, CA 90013

Dear: Ms. DeShazo

USE OF 305(b) GUIDANCE AS THE BASIS FOR 303(d) LISTING

Thank you for the opportunity to comment on the method to be applied to develop your list of impaired waters. In developing the 303 list we are mandated to evaluate all existing and readily available water quality-related information (see 40 C.F.R. 130.7(b)(5)). This carries with it the implication that readily available information should be sufficient for determining if a water is impaired. Within those confines , we could define a very rigorous threshold for determining impairment. However, it seems logical that the law would contemplate relying on the consideration of available information rather than a wholesale rejection of available information because it doesn't conform to a rigorous decision threshold. In other words, it is not necessary to have a comprehensive study with detailed statistical analysis of the magnitude, duration, and intensity of impact on beneficial uses to conclude that an impairment exists. In fact, a listing implies only that sufficient information exists to consider at least one point in the water body to have exceeded standards for at least one significant period of time. It does not mean the entire water body does not attain standards for all times. (In contrast to the listing process, the information needed for TMDL development may be quite a bit more extensive. At a minimum, the listing does not require information regarding the sources of pollution whereas the development of allocations within a TMDL does require knowledge of the sources and at least a general understanding of the magnitude of the contribution from the various sources.)

In considering how to look at available information, no standardized set of information can be used as a determinant for listing. All available information is to be considered. Therefore some means of bringing all types of information into the evaluation must be established. The typical description for this approach is a weight-of-evidence approach. In this method the evaluator weighs various pieces of information to demonstrate a credible line of reasoning leading to a conclusion about the condition of the water. Three possible conclusions exist: 1) the water is not meeting standards, 2) it is meeting standards, or 3) we just can't tell.

When assembling information it is often useful to first consider single lines of evidence. Is there a single type of information that sufficiently characterizes the waterbody's conditions to allow for a conclusion? In the case of numeric standards we look to the water column data to see if we can determine a clear signal. Numeric criteria consist of three parts: a chemical concentration, an averaging period, and an exceedance frequency. Typically our standards are stated as instantaneous maximum, hourly averages, 4-day averages, 30-day averages, monthly averages, or median values for a given period of time. An averaging period is involved in many samples. An average is a statistical metric of the population of data points and, by definition, is made up of values that lie above and below the stated value. The number of data points that fall above or below the average, and how far from the average a point may fall and still be considered part of the population that makes up the average, is not described by the average itself but by other measures such as the variance or standard deviation. We typically look at the distribution of the data and try to fit it to some form of standardized distribution. If the pattern of the data approximates a standard distribution we can use the standard mathematical and statistical methods available to analyze the information. We typically try to fit a normal distribution or log normal distribution to the available data, because many statistical methods have been developed to evaluate these distributions.

You have proposed using the methods recommended for the 1996 305(b) reporting process as the method of choice for evaluating your information. The 305(b) guidance relies on a quantile assessment of data to draw conclusions (the most commonly used quantile is the median). Specifically, the 1996 305(b) guidance is generally taken to recommend that when 10% of the data points fall above the numeric value of the criteria under consideration that the conclusion should be that the water is not attaining the water quality standard. This approach is also stated in the draft Consolidated Assessment and Listing Methodology (April 20, 2001). While this may be a useful rule of thumb, the quantile assessment method does not address the specific average stated in the standard or the frequency allowed for values exceeding the average (e.g. once every 3 years).

A typical data set for a water attaining standards will contain many values near or below the standard and relatively few values marking the extreme condition (the data are skewed, i.e. the distribution deviates from the standard normal distribution). If the extreme condition is a high flow event or above the usual value (the most common case) the extremes will act to pull the average up. If one compares the median to the mean in the common case, this implies the mean falls above the median. We can use this relationship in evaluating chemical data and information and as a basis for building the weight of evidence. However, unless we know the distribution of the data, we cannot conclude that when we have 10 % of our data above the mean we automatically have a condition of non-attainment.

Take for example the aquatic life protection criteria based on EPA methods. These values are 4-day averages not to be exceeded more than once every three years. We do not collect data that can be used to directly assess the 4-day average. Our sampling is typically grab samples, and are rarely collected on four consecutive days. A single grab sample cannot be used to evaluate the 4-day average. There is no way to determine the variability associated with the average or the sample from a single sample. However, the grab sample remains the best estimate of the 4-day average that we have. If we have a number of samples over a period of time we can evaluate the trend of these estimates. Over time, if the water is attaining standards, we would expect the mean of 4-day averages to approach the standard. That is to say the variability about a single mean estimate becomes insignificant and a determination of compliance with the standard can be reached. If we look to the relationship of the median to the mean we would expect the common circumstance of the mean above the median. If we find instead that the mean falls below the median we can assume the water is not behaving normally. If the mean of the samples also falls above the standard then we may assume we have a noncompliance situation. If we expect the common circumstance and find the mean above the median, then we would need to see a significant departure from the standard before we would be comfortable claiming impairment, unless we have a sufficient number of samples to statistically quantify the variance of the means (grab samples). If there is a large number of samples available we may be able to rely on statistical tests to show a condition of non-attainment when the mean is close to the median. This is because a small sample could easily be impacted by the variability inherent in the grab sample estimates or the mean itself. Since we have no way of evaluating this variability with a small sample size we should be cautious in claiming impairment where we see an expected pattern or condition.

For averaging periods where we have at least 3 samples within the averaging period we can make a direct estimate of variability and a more direct statistical analysis of conformity with the standard.

In most cases a small number of samples will not provide much assurance of the accuracy of the determination. In some cases even large number of samples will not yield conclusive statistical analyses. In these cases we look to supporting information. We depart from the single line of evidence and begin building an assessment based on indications from different types of data. There is not a prescribed approach to constructing the weight of evidence. But some simple rules of thumb may help. We typically look first at the most direct measure of the subject of the standard in question. For example, if this is a chemical concentration standard we look to chemistry information or if it is a narrative regarding aquatic community structure we look to bioassessment data. These data will provide an initial indication. We then look for other evidence that supports the indication. Are there land uses that have been associated with a problem indicated by the initial evaluation? Is there toxicity data to correspond to the chemical data? Are there official warnings or declarations of regulatory agencies that support the indication? Typically, unless we have a strongly compelling single line of evidence we will look to these multiple lines of information to bolster the decision. These lines of evidence can work to either support a listing or confirm that no listing is appropriate. Information such as photo monitoring is typically used as this type of ancillary information. In some cases quantitative photo monitoring techniques are used, and these can be treated as a single line of evidence.

The results of mathematical models that simulate water body conditions are typically looked at in light of a weight of evidence. That is, reliance on a model result alone is not usually used. Calibrated models add evidence that the model is accurately depicting water body conditions. Similarly, land use analysis typically requires additional information beyond simply the presence of a land use type that we have found to frequently be associated with water quality problems.

In many cases a clear conclusion will not be reached, either the information is not sufficient or it is contradictory and therefore no clear description of impairment is possible. For these waters we need to record this fact and identify these waters as a group. If the group is small when we are done listing we can pursue further assessment as resources allow. If a significant portion of the waters reviewed fall into this category then we must devise a programmatic response to addressing this information gap.

The rigor of the evidence used to recommend that a water be listed becomes a judgment decision of the Regional Boards and their staff. It must be kept in mind that a decision to list does not require the same certainty that is applied when determining violations of permit conditions. Constructing the list is not a regulatory action. It is an informational and administrative exercise that prioritizes our work and highlights problem locations. As such the judgment of staff is sufficient basis for listing. What is necessary is a reasonable rationale to support the listing or delisting, and documentation of the information relied on to reach that conclusion. The regulatory actions associated with listing come as a response to the list. TMDLs, standards actions, or other means of resolving the non-attainment condition are the regulatory instruments.

In summary, it is recommended that a weight of evidence approach be applied when developing the 303(d) list. Procedures recommended for 305(b) reporting are appropriately applied within the weight of evidence, but should not be relied on exclusively as the basis for determining non-attainment of a standard. This is because the 305(b) recommendations rely on a quantile assessment that does not consider the specific averaging and exceedance frequencies specified in standards. Where ample samples are available, statistical methods designed for standardized population distributions can be used to evaluate water quality conditions.

Sincerely,

/S/

Stefan Lorenzato
TMDL Coordinator

BK KC 7/11/01 cy to ... JS

SCAP

SOUTHERN CALIFORNIA ALLIANCE OF PUBLICLY OWNED TREATMENT WORKS

WATER QUALITY CONTROL BOARD

2001 JUL -5 P 12:14

July 3, 2001

John Robertus
San Diego Regional Water Quality Control Board
9771 Clairemont Mesa Boulevard, Suite A
San Diego, CA 92124-1324

Re: SCAP Comments on 2002 Water Quality Assessment and Update of the 303 (d) List of Impaired Waterbodies

Dear Mr. Robertus:

On behalf of the Southern California Alliance of Publicly Owned Treatment Works (SCAP), I am pleased to submit comments on the pending 305 (b) Water Quality Assessment and the 303 (d) list. SCAP's fifty-six public agency members provide wastewater and water services to over sixteen million residents in Southern California. The following comments were prepared by a workgroup of SCAP members.

1. SCAP encourages the Regional Board to carefully read and consider all comments submitted individually by our member agencies.
2. Under the Clean Water Act, as part of their biennial water quality assessments required under Section 305 (b), states are supposed to prepare analyses, among other things, of the extent to which "fishable/swimmable" uses have been or will be achieved, and what additional actions are necessary to achieve them; an estimate of the environmental impact, the economic and social costs, the economic and social benefits, and the estimated date of achievement; and a description of the nature and extent of nonpoint sources of pollutants, recommendations as to the programs which must be undertaken to control each category of such sources, and an estimate of the costs of implementing such programs. *33 U.S.C. Sec. 1315* The Regional Board must complete the required analyses during its water quality assessment, and we recommend that this be done prior to the 303 (d) listing process. We also request that a draft of the 305 (b) report be made available to the public for comment prior to being finalized and submitted to the State Water Resources Control Board.
3. SCAP supports the idea of a "preliminary list" or "watch list, on which waterbodies with inadequate or insufficient data would be placed in lieu of the 303 (d) list. Waters on the watch list would be targeted for further data gathering and assessment before either being placed on the 303 (d) list or designated as supporting the beneficial use(s). The National Research Council suggested such a list in their 2001 report assessing the effectiveness of TMDLs.[1] This has the potential to greatly reduce

[1] Assessing the TMDL Approach to Water Quality Management, prepublication copy, 2001.

30200 Rancho Viejo Road, Suite B
San Juan Capistrano, CA 92675
Fax: 949/489-0150 Tel: 949/489-7676

the burden caused by allocating valuable resources to addressing waters that may not truly be impaired, and focus funding and effort on true impairments.

4. SCAP urges caution regarding extrapolation of impacts on a specific waterbody based on data from a different body of water. Regional data, which have been generalized from limited data, when used, must be utilized appropriately.

5. SCAP believes that the Regional Board must only use adopted water quality standards, such as water quality objectives that have legally been adopted in the Basin Plan and approved by the State Water Resources Control Board, the Office of Administrative Law, and EPA, as the basis for the 305 (b) report or 303 (d) listings. Informal criteria that have not been formally adopted in accordance with Water Code requirements and the Administrative Procedures Act are known as "underground regulations" and cannot be legally used as the basis for the water quality assessment or 303 (d) listing.[2]

6. The Regional Board should specify what factors (including those listed below) are considered as "evidence," and how such evidence is weighted in making use of support/non-support decisions.

   a. Consider spatial, temporal (at several scales), and hydrologic variations and their effects on water quality when preparing the 2002 303 (d) list. We recommend that the Regional Board adopt a "weight of evidence" approach in preparing the 303 (d) list. Among other things, this will necessitate an understanding of variability in water quality data. In Southern California, stream flow is one of the largest sources of variability in water quality data. Stream flow is dependent on spatial, temporal (especially seasonal), and hydrologic variations. Not accounting for the effects of stream flow on water quality can bias the data set with respect to making impairment determinations. For the weight of evidence approach, one also will need to know how spatial variation was assessed, especially as it relates to effluent-dependent waterbodies. A good weight of evidence approach needs sample sets that are spatially and temporally representative of conditions in the waterbody. Sample locations should be characteristic of the main water mass or distinct hydrologic areas.

   b. For uses related to aquatic life, consider biological indicators as having a greater weight than pollutant concentration levels, to the extent that some waters may have unimpaired beneficial uses even though some chemical criteria have been exceeded. Among other reasons, this may occur because water quality objectives or criteria that are based on national guidance may not be reflective of local or site-specific conditions.

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[2] Cal. Gov. Code Sec. 11340 defines "regulation," in relevant part, as "every rule, regulation, order, or standard of general application or the amendment, supplement, or revision of any rule, regulation, order, or standard adopted by any state agency to implement, interpret, or make specific the law enforced or administered by it." Cal. Gov. Code Sec. 11342 An "underground regulation" is invalid and unenforceable because it has not been promulgated in accordance with the Administrative Procedures Act. *Frankel v. Kizer*, 21 Cal. App. 4th 743, 747 (Cal. App. 2d Dist., Dec. 13, 1993).

c. Consider on a case-by-case basis, whether or not a waterbody is oligotrophic, mesotrophic, or eutrophic and provide criteria for each type.

d. Eliminate subjective criteria such as "significant amount observed."

7. In the 1997 interagency 303 (d) listing guidance, EPA and SWRCB directed the Regional Boards to delist waters if certain factors were met. One guideline that does not appear to have been fully implemented called for recognition of control measures already in place – or expected to be installed within the next listing cycle – that will result in protection of beneficial uses. Control measures that should be considered an adequate basis for delisting include permits, clean up and abatement, cease and desist, or time schedule orders, and watershed management plans that are enforceable and include a time schedule for compliance with objectives. Prior EPA 303 (d) guidance also recommended this be taken into account. For example, within the Los Angeles Region, many inland waters are listed as being impaired by ammonia, yet all of the publicly owned treatment works are under compliance schedules to meet the ammonia water quality objectives contained in the Basin Plan in the next 1-2 years. Presumably, these waters will come into compliance with the ammonia objective when these dischargers meet this requirement. Therefore, we recommend that the Regional Board review these and other 303 (d) listings for which enforceable requirements have been adopted during this listing cycle.

8. In reviewing your prior staff reports regarding adoption of water quality assessment and/or 303 (d) listing, there has been very little explanation provided regarding how assessment decisions were made. Therefore, the following items reflect SCAP's recommendations that we believe are essential for the 2002 water quality assessment process.

In a recent Draft EPA Consolidated Assessment and Listing Methodology (CALM) report, several good recommendations are made for how states should conduct their listing processes. We are including several items based on CALM, as well as some additional items, that summarize the analytical and public review process we recommend the Regional Board follow. These comments supplement the comments previously submitted by SCAP regarding opportunities for public participation in the water quality assessment process.

- A thorough explanation of the thinking process that went into each decision should be made available in writing.
- The Regional Board should document each of the types of data that support water quality decision-making and explain how they are used in the context of applicable water quality standards to support different water quality determinations.
- A description of and reference for the quality assurance procedures should be included in water quality assessment and listing documentation. The Regional Board should define data quality requirements and how they utilize and interpret data to make decisions about whether the waterbody is impaired or attaining water quality standards.

- Metadata for the field data, i.e., when measurements were taken, locations, number of samples, detection limits, etc., should be in the administrative record and, upon request, made available to interested parties. The Regional Board should recognize that not all data are of equal value for assessing water quality standards attainment/impairment. Results of chemical data or any other type of data analysis are of limited value unless they are accompanied by documentation about sample collection (SOPs), analytical methods, and quality control protocols. Electronic copies of data and metadata should be made available, upon request.
- When data from citizen volunteer group's water quality monitoring efforts is used, the name of the group, the hours of training in water quality assessment completed by members of the group, SOPs, documentation of training of volunteers in both sampling and field testing, and whether a state certified lab was utilized should be provided. Finally, these data must meet the Regional Board's prior agreed upon standards for data quality.
- Sample size is an important element of data quality. In general, in the CALM draft, EPA is recommending that in order to have a high level of confidence in the results, a sample size of at least 30 samples is necessary. Recognizing that sample size is a big debate, we believe that a statistically-bases approach should be used in the listing process, with an adequate sample size. Therefore, the 5 samples, and sometimes 3 samples, used in prior assessment and listing processes seem less than sufficient. Not withstanding all the arguments about sample size, the tremendous implications of attainment/impairment decisions argue for the use of rigorous and statistically-valid data sets.
- What are the compelling reasons to list a waterbody, and does one reason have more weight than another?
- Fact sheets that explain proposed listings and delistings, including constituents of concern, the data used, and the water quality standard and the basis for the decision to list or delist must be provided to the public when the list is made available for public review. This is absolutely essential to enable informed public review, and will go a long way towards instilling confidence in the process and analysis prepared by the Regional Board.

SCAP is very aware of the tremendous burden this process puts on the Regional Board staff. These comments imply changes that we think will improve the process. SCAP looks forward to working with you during this process and recommends informal workshop meetings for this purpose.

Regards,

Raymond C. Miller

Raymond C. Miller
Executive Director

cc: Ken Cole

From: "Kris Whisenhunt" <kris@scap.occoxmail.com>
To: "James Smith" <smitj@rb9.swrcb.ca.gov>
Date: 7/3/01 3:25PM
Subject: Re: 303(d) listing process

Thanks Jimmy. I appreciate your help. Our mailing address is:

SCAP (Southern California Alliance of Publicly Owned Treatment Works)
30200 Rancho Viejo Road, Suite B
San Juan Capistrano, CA 92675

Kris
----- Original Message -----
From: James Smith <smitj@rb9.swrcb.ca.gov>
To: <kris@scap.occoxmail.com>
Cc: Keri Cole <colek.RB9Post.Region9@rb9.swrcb.ca.gov>
Sent: Tuesday, July 03, 2001 2:14 PM
Subject: 303(d) listing process

Hi Kris,

We are currently reviewing data for the 2002 303(d)-list up-date. We are analyzing data received during our solicitation period (7 March 01 to 15 May 01) from any and all sources. The solicitation was advertised in local newspapers, sent to our mailing list and public workshops were held on 4 April 01 and 3 May 01. We are currently screening the data for quality assurance and identifying any pollutants that exceed numeric and / or narrative standards established for the protection of all beneficial uses. Once this task is finished, we will be putting together our recommendations for additions / deletions to the 303(d) list.

We anticipate posting our draft recommendations in mid August and conducting a public workshop later that month. The public review and comment period will last thirty days. Our final recommendations will be presented before the Region 9 Board Members as an informational item at either the September or October Board Meeting. The list will then be forwarded to the State Water Resources Control Board (SWRCB) sometime near the end of October 01. It is the SWRCB that will be conducting the formal public comment period and the formal public hearings this winter.

We will add your name to our mailing list so that you are sure to receive future information. Please let me know your address. If possible, be sure to access our website at www.swrcb.ca.gov/rwqcb9 as it may contain the info you are seeking.

Thank you for your interest in this vital process,

-Jimmy

J. Smith
Environmental Specialist
Region 9 Water Quality Control Board
9771 Clairemont Mesa Blvd, Suite A
San Diego, CA 92124-1324
(858) 467-2732

From: "Linda Jones" <ljones@scap.occoxmail.com>
To: <smitj@rb9.swrcb.ca.gov>
Date: Tue, Jul 3, 2001 11:02 AM
Subject: 305b/303d Workshops

We would like to receive the workshop(s) schedule and the process that will be used to do the 305(b) report and the 303(d) list. Is it possible to receive this information by July 9th? Please advise by contacting us at SCAP at 949 489-7676 or respond via e-mail to kris@scap.occoxmail.com with any dates for scheduled public meetings on these topics. SCAP would like to be included on the mailing list for any meetings on these topics.

From: James Smith
To: kris@scap.occoxmail.com
Date: Tue, Jul 3, 2001 2:14 PM
Subject: 303(d) listing process

Hi Kris,

We are currently reviewing data for the 2002 303(d)-list up-date. We are analyzing data received during our solicitation period (7 March 01 to 15 May 01) from any and all sources. The solicitation was advertised in local newspapers, sent to our mailing list and public workshops were held on 4 April 01 and 3 May 01. We are currently screening the data for quality assurance and identifying any pollutants that exceed numeric and / or narrative standards established for the protection of all beneficial uses. Once this task is finished, we will be putting together our recommendations for additions / deletions to the 303(d) list.

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We will add your name to our mailing list so that you are sure to receive future information. Please let me know your address. If possible, be sure to access our website at www.swrcb.ca.gov/rwqcb9 as it may contain the info you are seeking.

Thank you for your interest in this vital process,

-Jimmy

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CC: Keri Cole

STATE OF CALIFORNIA
REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL COAST REGION

STAFF REPORT FOR REGULAR MEETING OF OCTOBER 26, 2001

Prepared on July 26, 2001

ITEM:

SUBJECT: Changes to 303(d) List of Impaired Water Bodies

SUMMARY:

To achieve the water quality goals of the Clean Water Act, the United States Environmental Protection Agency's (USEPA's) first objective is to ensure that technology-based controls on point sources are established and maintained. Where such controls are insufficient to attain and maintain water quality standards, water quality-based controls are required.

The State is required to identify a list of impaired water bodies requiring water quality based controls, or Total Maximum Daily Loads (TMDLS), under Section 303(d) of the Federal Clean Water Act (CWA). The TMDL will evaluate waters upstream of the 303(d) listed water as well as the 303(d) listed water. The Regional Water Quality Control Board, Central Coast Region (RWQCB) will consider public comments and provide recommended Section 303(d) List changes to the State Water Resources Control Board (SWRCB). Changes are being proposed for the 1998 303(d) List. The SWRCB will review recommendations from all the Regional Boards. The SWRCB will hold a public hearing and consider public comments; finalize the 303(d) List; and transmit the List to the USEPA.

The RWQCB solicited information from the public to consider for the 303(d) List. (This letter is shown in Attachment One.) The public was given until May 15, 2001 to provide information. The Regional Board only considered information provided by May 15, 2001 in this recommendation. The Regional Board is only accepting comments about proposed changes to the 303(d) List identified in Attachment Two.

The 303(d) List update includes additions to water bodies and pollutants; removal of water bodies and pollutants, if standards are attained; and changes to the description of water bodies currently listed (for example, refinement of identified impaired reaches, changes in priority, etc).

DISCUSSION:

Background

Since the 1990s, emphasis has been placed on the 303(d) List. Under the authority of Section 303(d) of the Clean Water Act, USEPA expects States to develop a Total Maximum Daily Loads (TMDLs) for waters on the List where technology based effluent limits or other legally required pollution control mechanisms are not sufficient or stringent enough to implement the water quality standards applicable to such waters. Updates of the list must be performed according to Section 303(d) of the Clean Water Act. Updates include adding or removing waters, and indicating Regional Board priorities and schedules for developing TMDLS. A TMDL is a plan to attain water quality standards. This plan allocates pollution control responsibilities among pollution sources in a watershed, and it is the basis for taking actions needed to restore a waterbody.

The USEPA (40CFR 130.7[a][5]) directs States to "assemble and evaluate all existing and readily available water quality-related data and information" to develop the Section 303(d) List and priorities for TMDLs. Ideally, this process should involve review of information such as monitoring data, scientific literature, or resource management agency files that document water quality conditions and trends.

Approach to Listing Waters

The general factors used by the Regional Board staff recommended changes to the 303(d) List for surface waters within the Central Coast Region are shown below. These factors are the same as the 1998 listing factors. Staff obtained these factors from the 1998 Clean Water Act Section 303(d) Listing Guidelines for California (August 11, 1997) (hereafter referred to as "Listing Guidelines"). The Listing Guidelines were developed by an ad hoc workgroup of staff from the Regional Water Quality Control Boards, the State Water Resource Control Board, and the USEPA.

Listing Factors

1. Effluent limitations or other pollution control requirements [e.g., Best Management Practices (BMPs)] are not stringent enough to assure protection of beneficial uses and attainment of SWRCB and RWQCB objectives, including those implementing SWRCB Resolution Number 68-16 "Statement of Policy with Respect to Maintaining High Quality of Waters in California."

2. Fishing, drinking water, or swimming advisory currently in effect. This does not apply to advisories related to discharge in violation of existing WDRs or NPDES permit.

3. Beneficial uses are impaired or are expected to be impaired within the listing cycle (i.e. in next two years). Impairment is based upon evaluation of chemical, physical, or biological integrity. Impairment will be determined by "qualitative assessment", physical/chemical monitoring, bioassay tests, and/or other biological monitoring. Applicable Federal criteria and RWQCB Water Quality Control Plans determine the basis for impairment status.

4. The water body is on the previous 303(d) List and either: (a monitored assessment" continues to demonstrate a violation of objective(s) or (b) "monitored assessment" has not been performed.

5. Data indicate tissue concentrations in consumable body parts of fish or shellfish exceed applicable tissue criteria or guidelines. Such criteria or guidelines may include SWRCB Maximum Tissue Residue Level values, FDA Action Levels, NAS Guidelines, and U.S. EPA tissue criteria for the protection of wildlife as they become available.

6. The water quality is of such concern that the RWQCB determines the water body needs to be afforded a level of protection offered by a 303(d) listing.

Evaluation Approach

Staff is utilizing a "weight of evidence" approach to develop new listings for the Regional Board's recommendation. Staff is interpreting "weight of evidence" to mean more water quality data exists to indicate impairment than water quality data that does not indicate impairment. Staff considers the "weight of evidence" to occur where 50% or greater of all samples for a given water body exceed applicable *Water Quality Control Plan, Central Coast Region* (Basin Plan) standards, State Water Resources Control Board Ocean Plan standards, or Assembly Bill (AB) 411 beach posting guidelines.

Staff only considered data that had been collected and analyzed with appropriate certified quality assurance/quality control procedures. The type of information that was readily available to the Central Coast Regional Board to develop the 303(d) list was primarily conventional water quality data. This type of data is for constituents such as total dissolved solids, sodium, chloride, nitrate, dissolved oxygen, and bacteria. The data set for each constituent for each water body was individually reviewed to determine whether 50% or greater of the samples had values greater than the applicable water quality criteria or guideline for that constituent. If so, the waterbody/pollutant combination is proposed as a new listing. Statistical methods were not utilized as a listing approach (i.e. mean values, median values were not calculated).

There are no specific minimum data requirements or a specific frequency of exceedences for making a finding that water quality objectives are not attained. (This is particularly the case when statistical approaches are not used, such as basing attainment upon mean or median values for a given site.) In general, more data is needed to interpret environmental results that are specific to time and geography. Less data would be needed to make a determination based on environmental results that serve as integrators over space and time. For example, more water column chemistry data would generally be needed to determine impairment than fish tissue chemistry data. All the data received and evaluated by the Regional Board staff for this update was water column data.

The rigor of evidence used to recommend that a water be listed is a judgment decision of the Regional Boards and their staff. It must be kept in mind that a decision to list does not require the same certainty that is applied when determining violations of permit conditions. Constructing the list is not a regulatory action. This is an informational and administrative exercise that prioritizes our work and highlights problem locations. As such, the judgment of staff is sufficient basis for listing. What is necessary is a reasonable rationale to support the listing or delisting, and documentation of the information relied on to reach that conclusion. The regulatory actions associated with listing come as a response to the list. TMDLs, standards actions, or other means of resolving the non-attainment condition are the regulatory instruments.

Development of a TMDL "Problem Statement" (and subsequent TMDL components) is the more appropriate mechanism to evaluate data more rigorously and determine a stronger, clearer, and scientific basis for impairment. If the problem can be clearly defined, staff proceeds with TMDL development. If the problem remains unclear or there does not appear to be adequate data to proceed with TMDL development, additional monitoring can be scheduled at this point or any point during TMDL development to fill data gaps or improve information. If after collecting adequate data the problem cannot be determined, the waterbody can be delisted.

Delisting Factors

According to the Listing Guidelines, water bodies may be delisted for specific pollutants or stressors if any one of these factors is met:

1. Objectives are revised (for example, Site Specific Objectives), and the exceedence is thereby eliminated.

2. A beneficial use is de-designated after U.S. EPA approval of a Use Attainability Analysis, and the non-support issue is thereby eliminated.

3. Faulty data led to the initial listing. Faulty data include, but are not limited to typographical errors, improper quality assurance/quality control (QA/QC) procedures, or Toxic Substances Monitoring/State Mussel Watch Elevated Data Levels which are not confirmed by risk assessment for human consumption.

4. It has been documented that the objectives are being met and beneficial uses are not impaired based upon "Monitored Assessment" criteria.

5. A TMDL has been approved by the U.S. EPA.

6. There are control measures in place which will result in protection of beneficial uses. Control measures include permits, cleanup and abatement orders, and watershed management plans which are enforceable and include a time schedule.

Proposed TMDL Priorities

A priority ranking is required for listed waters to guide TMDL planning pursuant to 40 CFR 130.7. TMDLs will be ranked into 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 of impairment or threat (such as number of pollutants/stressors of concern, and number of beneficial uses impaired or threatened),
- conformity with related activities in the watershed (such as existence of watershed assessment, planning, pollution control and remediation, or restoration efforts in the area),
- potential for beneficial use protection or recovery,
- degree of public concern, and
- available information.

It should be noted that the criteria can be applied in different ways to different water bodies and pollutants. For example, a water body may be severely impaired, but if there is little likelihood of beneficial use recovery than a lower priority might be given. Staff also considered (1) the overall need for an adequate pace of TMDL development for all listed waters and (2) if other water bodies and pollutants have become a higher priority.

Staff also assigned a higher priority according to Regional Board priority watersheds (Salinas, Morro Bay, San Lorenzo, Pajaro, Santa Maria, and Santa Ynez).

Schedules for TMDL development after the first two years should be regarded as <u>very tentative.</u> Completion will depend significantly upon the availability of funding, availability of staff, on watershed stakeholder group priorities, and RWQCB Basin Plan amendment priority. They will also depend upon further evaluation of the need for and feasibility of TMDLs. If additional water bodies are listed in 2002 or subsequent 303(d) review cycles these schedules will also need to be revised.

Public Solicitation

Regional Board staff solicited public information and comments regarding 303(d) List additions on March 7, 2001(Attachment One). The public was notified that information must be received by May 15, 2001. The public solicitation letter was also placed on the Central Coast Region's web page.

Information and data considered that resulted in new listings of impaired waterbodies is discussed below and in Attachment Three. Information and data considered that did not result in new listings is discussed in Attachment Four. Regional Board staff only considered data with proper quality assurance/quality control. Only conditions with 50% or greater of all samples for a given water body exceeding applicable Basin Plan, Ocean Plan, or AB 411 criteria were proposed as new listings.

The Santa Barbara County Public Health Department submitted water quality data as a result of the March 7, 2001 public information solicitation. The County's data indicates impairment of three additional Santa Barbara County beaches. The County utilizes QA/QC procedures to assure reliable sample results. The samples are analyzed at the Santa Barbara County Public Health Laboratory.

Other information/data was also received, but it did not result in new 303(d) listings. This information is described in Attachment Four.

Regional Board Information Reviewed

Many potential data sources exist and/or were submitted in response to the public solicitation. Potential data sources include State Mussel Watch/Toxic Substances Monitoring; beach-monitoring data; monitoring data for regulated/unregulated discharges; and data from other local, state and federal agencies. Listing information can be obtained from reports containing trend analysis/water quality assessment information. Where available, these sources were utilized. For example, the California Department of Pesticide Regulation provided water quality data. (No new water quality impairment conditions were identified.) Some data sources did not have additional information beyond that which was available in 1998 (such as State Mussel Watch or Toxic Substances Monitoring data).

The Central Coast Region has developed an ambient water quality monitoring program called the Central Coast Ambient Monitoring Program (CCAMP). The CCAMP surface water monitoring strategy is to focus on watersheds and coastal confluences. CCAMP watershed characterization calls for dividing the Central Coast Region into five watershed rotation areas and conducting synoptic, tributary based sampling each year in one of the areas. Over a five-year period, all the hydrologic units in the Region are monitored and evaluated. Permanent watershed sites are monitored monthly for conventional water quality parameters, and once during the year for sediment chemistry, bioaccumulation, and benthic invertebrate assemblages. In addition to the synoptic site selection approach, additional monitoring sites are established in each rotation area to provide focused attention on watershed and water bodies known to have water quality impairments.

CCAMP utilizes quality assurance/quality control (QA/QC) procedures to develop reliable water quality sampling results. Requirements for field and laboratory duplicates and blanks, adherence to field sampling protocols, chain of custody, chain of data processing, and similar quality assurance procedures are set forth for data collected by CCAMP and its contractors. Only the State Department of Health Services certified labs perform data analyses.

Federal law requires States to consider 305(b) reports when developing 303(d) list. 303(d) regulations requires the state to consider "[w] aters identified by the State in its most recent section 305(b) report as 'partially meeting' or 'not meeting' designated uses or as 'threatened';" [40 C.F.R.sec. 130.7 (b)(5)(i)]. In the case of the Central Coast Regional Board, the 305(b) report relies upon CCAMP data. CCAMP data is also the same data source used for the 303(d) list. Reviewing this data resulted in several new listings (see next section and Attachments Two and Three).

In addition to CCAMP, staff used monitoring data generated by the Morro Bay National Estuary Program. This ten year sampling program monitors several stations within the Morro Bay watershed. Sampling and analysis is performed according to the Quality Assurance Project Plan (RWQCB, 1996). This data resulted in one new listing.

Another data source staff used for the proposed 303(d) List is South County Regional Wastewater Authority (SCRWA) monitoring data generated by Waste Discharge Requirements. In particular, staff utilized data for Llagas Creek upstream of this facility to support listing. This upstream Llagas Creek water quality data was compared to site-specific water quality objectives contained in Table 3-7 of the Basin Plan. Regional Board Waste Discharge Requirements stipulate QA/QC procedures within the Standard Provisions and Reporting Requirements for Waste Discharge Requirements. This data resulted in four new listings.

Staff is proposing to add several water quality impairments to the 1998-303(d) List.

Proposed Changes To 303(D) List

Proposed Listings

The recommended changes to the 1998-303(d) list are shown in Attachment Two. Additions are shown in a highlighted format and deletions are shown in a ~~strikethrough~~ format.

More information about proposed new listings is shown in Attachment Three. Included is staff's rationale for adding a specific condition.

Proposed 303(d) Delistings

Staff is proposing to remove water quality conditions from the 1998-303(d) List. Waters proposed for delisting are summarized below and shown in a ~~strikethrough~~ format in Attachment Two. Attachment Five contains detailed rationale for proposed listing.

Chorro Creek Metals

Staff is proposing to delist Chorro Creek for metals after evaluating data and finding conditions support delisting factor three because sample data showing exceedences was collected from outside of the waterway. Available information also supports delisting factor four based on aquatic habitat data submitted after the listing by the California National Guard. Chorro Creek will remain on the list for Siltation which also supports delisting factor six because sediment reductions required under the Siltation TMDL are expected to also reduce metals loads in Chorro Creek.

Los Osos Creek Priority Organics

Staff is proposing to delist Los Osos Creek for Priority Organics. Water column and sediment data was collected as part of a monitored assessment and no exceedences of standards existed. Therefore delisting factor four is supported. Los Osos Creek will remain on the list for Siltation which also supports delisting factor six because sediment reductions required under the Siltation TMDL are expected to also reduce pesticides loads in Los Osos Creek.

San Lorenzo River Estuary—Siltation

Staff is proposing to delist the San Lorenzo River Lagoon. The original listing appears to have been based on generic data that was not truly indicative of the conditions in the San Lorenzo River Lagoon. This conclusion supports delisting factor three, use of faulty data. The City of Santa Cruz's 1989 study of the lower San Lorenzo River (Philip Williams & Associates, et al, 1989), which includes the Lagoon Management Plan, has established that problems within the lagoon are associated with the breaching of the sand bar that becomes established between the lagoon and Monterey Bay, and are not due to the delivery of sediment from upstream sources.

Other Changes Proposed

Attachment Two indicates a priority and schedule for each new listing and changes to priority and schedule for some existing listings.

The following general comments provide background and justification for proposed schedules shown on Attachment Two. While initial assessments started for several listings between 1996 and 1998, TMDL development did not. From 1996 to 2000, TMDL-related efforts focused on updating the 1998 303(d) list and assessing resource needs and priorities for TMDL development, watershed management, and establishment of CCAMP. In July 1999, Region 3 secured dedicated resources (for five staff people) for TMDL development. These resources were augmented in July 2000 (with three additional staff people). Much of the TMDL effort during 1999 focused on recruiting, hiring, and training new staff, establishing the TMDL program and integrating the program into the Watershed Branch. Actual TMDL development work throughout Region 3, as defined by the 1998 303(d) List, began in July 2000 and significantly increased in January 2001. Hence several start dates have been proposed to be modified on the 303(d) list to better reflect this overall schedule. Proposed schedules for the new listings have been determined in conjunction with this overall schedule as well. Additionallly, USEPA requires that TMDLs be scheduled for completion within 13 years of the year a waterbody is listed (2015 for waters added to the list as part of this 2002 303(d) List Update). Specific reasons for each change are indicated in footnotes on Attachment Two.

Listing Clarifications

San Luis Obispo Creek Priority Organics

Staff if proposing to delist San Luis Obispo Creek for Priority Organics and refining/clarifying the listing to PCB. Exceedences of hexachlorocyclohexane (HCH), chlordane, and polychlorinated biphenyl (PCB) served as the basis of the original listing for priority organics. Staff revisited data that was the basis of the initial listing, and have recently preformed a monitored assessment. Reconsideration of the original data supports delisting for HCH based on delisting criteria three. Results of the monitored assessment supports delisting for chlordane based on delisting criteria four. San Luis Obispo Creek will remain listed for PCB because the monitored assessment conducted does not support delisting for this constituent. Attachment five contains detailed report for this proposed clarification.

COMMENTS:

Pending

ATTACHMENTS:

1. March 7, 2001 Public Solicitation Letter
2. Recommended Central Coast Region 2001 303 (d) List
3. Listing Rationale
4. Information Received that did not result in 303(d) List Additions
5. Delisting and Clarification Rationale

RECOMMENDATION:

Approve staff recommendation for changes to the 1998-303(d) List.

ATTACHMENT THREE. LISTING RATIONALE FOR 2OO1 303(D) LIST

Watershed	Water Body	Pollutant	Rationale	Total Samples	Monitoring Dates	Data Source(s)
Estero Bay	Los Osos Creek	Dissolved Oxygen	Basin Plan Objective violated 64% of samples at station "WAR"	359	12/14/93-4/19/99	Morro Bay National Monitoring Program
Estrella	Cholame	Fecal Coliform	Basin Plan Objective violated 80% of samples	10	2/02/99-2/08/00	Central Coast Ambient Monitoring Program (CCAMP)
Pajaro	Llagas Creek	Fecal Coliform	Basin Plan Objective violated 63% of samples for stations "FRA", "LLA", and "VIS"	41	12/18/97-6/12/98	CCAMP
Pajaro	Llagas Creek	Chloride	Basin Plan Site-Specific Objective violated 100% of samples	78	6/23/92-6/13/00	South County Regional Wastewater Authority (SCRWA) Wastewater Discharge Requirement Monitoring Program (all samples are upstream of SCRWA)
Pajaro	Llagas Creek	Dissolved Oxygen	Basin Plan Objective violated 66% of samples	128	9/12/88-6/13/00	SCRWA Wastewater Discharge Requirement Monitoring Program and CCAMP predawn sampling

LISTING RATIONALE FOR 2OO1 303(D) LIST

Watershed	Water Body	Pollutant	Rationale	Total Samples	Monitoring Dates	Data Source(s)
Pajaro	Llagas Creek	Sodium	Basin Plan Site-Specific Objective violated 77% of samples	78	6/23/92-6/13/00	SCRWA Wastewater Discharge Requirement Monitoring Program (all samples are upstream of SCRWA)
Pajaro	Llagas Creek	Total Dissolved Solids	Basin Plan Site-Specific Objective violated 100% of samples	90	9/12/88-6/13/00	SCRWA Wastewater Discharge Requirement Monitoring Program (all samples are upstream of SCRWA)
Pajaro	Pajaro River	Fecal Coliform	Basin Plan Objective violated 90% of samples at Station "FRA"	11	12/18/97-1/07/99	CCAMP
Pajaro	Tesquita Slough	Fecal Coliform	Basin Plan Objective violated 63% of samples	16	12/18/97-12/16/98	CCAMP
Salinas	Alisal Creek	Fecal Coliform	Basin Plan Objective violated 83% of samples	6	7/28/99-2/10/00	CCAMP
Salinas	Atascadero Creek	Dissolved Oxygen	Basin Plan Objective violated 67% of samples from CCAMP data	20	4/7/99-5/15/00	CCAMP

LISTING RATIONALE FOR 2OO1 303(D) LIST

Watershed	Water Body	Pollutant	Rationale	Total Samples	Monitoring Dates	Data Source(s)
Salinas	Gabilan	Fecal Coliform	Basin Plan Objective violated 100% of samples	6	2/1/99-2/10/00	CCAMP
Salinas	Quail Creek	Fecal Coliform	Basin Plan Objective violated 63% of samples	6	2/01/99-11/30/00	CCAMP
Salinas	Salinas Reclamation Canal	Fecal Coliform	Basin Plan Objective violated 89% of samples	37	2/01/99-2/10/00	CCAMP
Salinas	Salinas River (Upper)	Chloride	Basin Plan Site-Specific Objective violated 100% of samples	42	2/2/99-4/26/00	CCAMP
Salinas	Salinas River (Upper)	Sodium	Basin Plan Site-Specific Objective violated 100 % of samples	32	5/13/90-2/8/00	CCAMP
Salinas	San Lorenzo Creek	Fecal Coliform	Basin Plan Objective violated 60% of samples; Station "LOK" violated Basin Plan Objective 100% of samples	15	2/02/99-2/10/00	CCAMP

LISTING RATIONALE FOR 2OO1 303(D) LIST

Watershed	Water Body	Pollutant	Rationale	Total Samples	Monitoring Dates	Data Source(s)
Salinas	Tembladero Slough	Fecal Coliform	Basin Plan Objective violated 63% of samples	8	4/26/99-2/07/00	CCAMP
Santa Maria	Alamo Creek	Fecal Coliform	Basin Plan Objective violated 57% of samples	14	2/01/00-1/31/01	CCAMP
Santa Maria	Blosser Channel	Fecal Coliform	Basin Plan Objective violated 50% of samples	10	5/03/00-2/28/01	CCAMP
Santa Maria	Bradley Canyon Creek	Fecal Coliform	Basin Plan Objective violated 60% of samples	25	1/12/00-1/29/01	CCAMP
Santa Maria	Main Street Drain	Nutrients	Basin Plan Nitrate Drinking Water Objective violated 60 % of samples at Main Street Drain	10	1/12/00-1/29/01	CCAMP
Santa Maria	Nipomo Creek	Fecal Coliform	Basin Plan Objective violated 72% of samples	25	1/11/00-1/31/01	CCAMP
Santa Maria	Orcutt Solomon Creek	Fecal Coliform	Basin Plan Objective violated 62% of samples	50	1/12/00-2/28/01	CCAMP

LISTING RATIONALE FOR 2OO1 303(D) LIST

Watershed	Water Body	Pollutant	Rationale	Total Samples	Monitoring Dates	Data Source(s)
Santa Maria	Oso Flaco Lake	Nutrients	Basin Plan Nitrate Drinking water objective violated 100 % of samples	55	1/12/00-1/31/01	CCAMP
Santa Maria	Santa Maria River	Fecal Coliform	Basin Plan Objective violated 52% of samples	33	1/12/00-2/28/01	CCAMP
Santa Maria	Santa Maria River	Nutrients	Basin Plan Nitrate Drinking water objective violated 100 % of samples at Stations SMA and SMI	23	1/12/01-2/28/01	CCAMP
South Coast	Pacific Ocean @ Arroyo Quemado Beach	Total Coliform	Ocean Plan Shellfish objective violated 85% of time	250	3/24/97-4/25/01	Santa Barbara County Public Health Department
South Coast	Pacific Ocean @ Arroyo Quemado Beach	Fecal Coliform	Ocean Plan Water Contact objective violated 57% of time	250	3/24/97-4/25/01	Santa Barbara County Public Health Department
South Coast	Pacific Ocean @ Mission Creek (East Beach)	Total Coliform	Ocean Plan Shellfish objective violated 69% of samples	262	9/10/96-4/23/01	Santa Barbara County Public Health Department

LISTING RATIONALE FOR 2OO1 303(D) LIST

Watershed	Water Body	Pollutant	Rationale	Total Samples	Monitoring Dates	Data Source(s)
South Coast	Pacific Ocean @ Mission Creek (East Beach)	Fecal Coliform	Assembly Bill 411 Beach posting recommendation violated 61% of time;	262	9/10/96-4/23/01	Santa Barbara County Public Health Department
South Coast	Pacific Ocean @ Jalama Beach	Total Coliform	Ocean Plan Shellfish objective violated 53% of samples	222	3/10/97-4/23/01	Santa Barbara County Public Health Department
South Coast	Pacific Ocean @ Jalama Beach	Fecal Coliform	Assembly Bill 411 Beach posting recommendation violated 50% of time	222	3/10/97-4/23/01	Santa Barbara County Public Health Department

Attachment Two

2001 CENTRAL COAST REGIONAL BOARD 303 (D) AND TMDL PRIORITY LIST

TYPE	WATER BODY NAME	HYDRO UNIT	CAUSES	SOURCE	PRIORITY	SIZE AFFECTED	UNIT	START DATE	END DATE
B	Monterey Bay South	309.500	Pesticides	Agriculture	Low	10	Miles	2005[a]	2011
			Metals	Surface Mining	Low	10	Miles	2005[a]	2011
B	Monterey Harbor	309.500	Unknown Toxicity	Source Unknown	Low	74	Acres	2005[a]	2011
			Metals	Railroad Slag Pile	Medium	74	Acres	1998	2003
B	Morro Bay	310.220	Metals	Surface Mining Nonpoint Source Boat Discharges/Vessel Wastes	High	100	Acres	1996	2000
			Sedimentation/Siltation	Agriculture Irrigated Crop Production Construction/Land Development Resource Extraction Channelization Channel Erosion	High	100	Acres	1996	1999
			Pathogens	Upland Grazing Urban Runoff/Storm Sewers Septage Disposal Natural Sources Nonpoint Source	High	50	Acres	1996	2000
B	Moss Landing Harbor	306.000	Pesticides	Agriculture Irrigated Crop Production Specialty Crop Production	Low	160	Acres	2005	2009
			Sedimentation/Siltation	Agriculture Irrigated Crop Production Agriculture-storm runoff Hydromodification Dredging (Hydromod.) Channel Erosion Erosion/Siltation Nonpoint Source	Low	160	Acres	2005	2009
			Pathogens	Agriculture Nonpoint Source Boat Discharges/Vessel Wastes	Low	40	Acres	2005	2009

2001 CENTRAL COAST REGIONAL BOARD 303 (D) AND TMDL PRIORITY LIST

TYPE	WATER BODY NAME	HYDRO UNIT	CAUSES	SOURCE	PRIORITY	SIZE AFFECTED	UNIT	START DATE	END DATE
E	Carpinteria Marsh (El Estero Marsh)	315.340	Priority Organics	Urban Runoff/Storm Sewers	Low	80	Acres	2006	2011
			Nutrients	Agriculture	Low	80	Acres	2006	2011
			Sedimentation/Siltation	Agriculture Construction/Land Development Storm sewers	Low	80	Acres	2006	2011
			Org. enrichment/Low D.O.	Agriculture	Low	80	Acres	2006	2011
E	Elkhorn Slough	306.000	Pesticides	Agriculture Irrigated Crop Production Agriculture-storm runoff Agricultural Return Flows Contaminated Sediments Erosion/Siltation Nonpoint Source	Low	500	Acres	2005	2009
			Sedimentation/Siltation	Agriculture Irrigated Crop Production Agriculture-storm runoff Channel Erosion Nonpoint Source	Low	50	Acres	2005	2009
			Pathogens	Natural Sources Nonpoint Source	Low	500	Acres	2005	2009
E	Goleta Slough	315.310	Priority Organics	Nonpoint Source	Low	200	Acres	2006	2011
			Metals	Industrial Point Sources	Low	200	Acres	2006	2011
			Sedimentation/Siltation	Construction/Land Development	Low	200	Acres	2006	2011
			Pathogens	Urban Runoff/Storm Sewers	High[3]	200	Acres	2006	2011
E	Moro Cojo Slough	309.100	Pesticides	Agriculture Irrigated Crop Production Agriculture-storm runoff Agricultural Return Flows Nonpoint Source	Low	345	Acres	2001[b]	2011
			Sedimentation/Siltation	Agriculture Irrigated Crop Production Agriculture-storm runoff Construction/Land Development	Low	345	Acres	2000[c]	2011

2001 CENTRAL COAST REGIONAL BOARD 303 (D) AND TMDL PRIORITY LIST

TYPE	WATER BODY NAME	HYDRO UNIT	CAUSES	SOURCE	PRIORITY	SIZE AFFECTED	UNIT	START DATE	END DATE
E	Old Salinas River Estuary	309.110	Pesticides	Agriculture Irrigated Crop Production Agriculture-storm runoff Agriculture-irrigation tailwater Agricultural Return Flows Nonpoint Source	Medium	50	Acres	2001[b]	2003
			Nutrients	Agriculture Irrigated Crop Production Agriculture-irrigation tailwater Nonpoint Source	Medium	50	Acres	2001[b]	2003
E	Salinas River Lagoon (North)	309.100	Pesticides	Agriculture	Medium	75	Acres	2001[b]	2003
			Nutrients	Nonpoint Source	Medium	75	Acres	2001[b]	2003
			Sedimentation/Siltation	Nonpoint Source	Medium	75	Acres	2000[c]	2001
E	Salinas River Refuge Lagoon (South)	309.100	Pesticides	Agriculture	Medium	163	Acres	2001[b]	2003
			Nutrients	Agriculture	Medium	163	Acres	2001[b]	2001
			Salinity/TDS/Chlorides	Agriculture	Medium	163	Acres	2001[b]	2003
E	San Lorenzo River Estuary	304.120	~~Sedimentation/Siltation~~	~~Hydromodification~~	~~High~~	~~20~~	~~Acres~~	~~1998~~	~~2000~~
			Pathogens	Urban Runoff/Storm Sewers Natural Sources	Medium	20	Acres	1999	2001
E	Soquel Lagoon	304.130	Nutrients	Septage Disposal Nonpoint Source	Low	2	Acres	2003	2007
			Sedimentation/Siltation	Construction/Land Development	Medium	2	Acres	2001	2005
			Pathogens	Urban Runoff/Storm Sewers Natural Sources Nonpoint Source	High[3]	2	Acres	2003	2007
E	Tesquita Slough	305.300	Fecal Coliform	Agriculture Nonpoint Source Natural Sources	Medium[2]	5	Miles	2004[h]	2015
L	Hernandez Reservoir	305.500	Mercury	Subsurface Mining	Medium	619	Acres	2001[d]	2003

2001 CENTRAL COAST REGIONAL BOARD 303 (D) AND TMDL PRIORITY LIST

TYPE	WATER BODY NAME	HYDRO UNIT	CAUSES	SOURCE	PRIORITY	SIZE AFFECTED	UNIT	START DATE	END DATE
L	Nacimiento Reservoir	309.820	Metals	Subsurface Mining Natural Sources	High	5370	Acres	1997	2000
L	Oso Flaco Lake	312.100	Nitrate	Agriculture Nonpoint Source	Medium[1]	8	Acres	2006[d]	2015
L	Schwan Lake	304.120	Nutrients	Nonpoint Source	Low	32	Acres	2006	2011
			Pathogens	Urban Runoff/Storm Sewers Natural Sources	High[3]	32	Acres	2006	2011
R	Alamo Creek	312.300	Fecal Coliform	Natural Sources Agriculture Range Land	Medium[2]	5	Miles	2006[i]	2015
R	Alisal Creek	309.200	Fecal Coliform	Urban Runoff Natural Sources Nonpoint Source Agriculture	Medium[2]	15	Miles	2003	2015
R	Aptos Creek	304.130	Sedimentation/Siltation	Disturbed Sites (Land Develop.) Channel Erosion	Medium	4	Miles	2001	2001
			Pathogens	Urban Runoff/Storm Sewers	Low	4	Miles	2005	2011
~~R~~	~~Arroyo Burro Creek~~ (Moved to coastal water section)	~~315.320~~	~~Pathogens~~	~~Urban Runoff/Storm Sewers~~ ~~Nonpoint Source~~	~~Medium~~	~~6~~	~~Miles~~	~~2006~~	~~2011~~
R	Atascadero Creek	309.810	Dissolved Oxygen	Agriculture Urban Runoff Unknown Source	Medium[1]	5	Miles	2004[h]	2015
R	Blanco Drain	309.100	Pesticides	Agriculture Irrigated Crop Production Agriculture-storm runoff Agriculture-irrigation tailwater Agricultural Return Flows Nonpoint Source	Medium	8	Miles	2001[b]	2005
R	Blosser Creek	312.100	Fecal Coliform	Agriculture Pasture Lands Urban Runoff Storm water Natural Sources	Medium[1]	5	Miles	2006[l]	2015

2001 CENTRAL COAST REGIONAL BOARD 303 (D) AND TMDL PRIORITY LIST

TYPE	WATER BODY NAME	HYDRO UNIT	CAUSES	SOURCE	PRIORITY	SIZE AFFECTED	UNIT	START DATE	END DATE
R	Bradley Canyon Creek	312.100	Fecal Coliform	Agriculture Urban Runoff Pasture Lands Natural Sources	Medium[1]	5	Miles	2006[1]	2015
R	Carbonera Creek	304.120	Nutrients	Nonpoint Source	High	10	Miles	1993	2000
			Sedimentation/Siltation	Construction/Land Development Nonpoint Source	High	10	Miles	1998	2000
			Pathogens	Urban Runoff/Storm Sewers Nonpoint Source	Medium	10	Miles	1999	2001
R	Carpinteria Creek	315.340	Pathogens	Agriculture Land Disposal Septage Disposal	High[3]	6	Miles	2006	2011
R	Cholame Creek	317.000	Fecal Coliform	Pasture Lands Nonpoint Source Natural Sources Agriculture	Medium[2]	8	Miles	2004[h]	2015
R	Chorro Creek	310.220	~~Metals~~	~~Resource Extraction~~ ~~Mine Tailings~~	~~High~~	~~11~~	~~Miles~~	~~1996~~	~~2000~~
			Nutrients	Municipal Point Sources Agriculture Irrigated Crop Production Agriculture-storm runoff	High	11	Miles	1996	2000
			Sedimentation/Siltation	Agriculture Irrigated Crop Production Range Land Upland Grazing Agriculture-storm runoff Construction/Land Development Road Construction Resource Extraction Hydromodification Channelization Streambank Modification/Destabilization Channel Erosion Erosion/Siltation Natural Sources Golf course activities Nonpoint Source	High	11	Miles	1996	1999

2001 CENTRAL COAST REGIONAL BOARD 303 (D) AND TMDL PRIORITY LIST

TYPE	WATER BODY NAME	HYDRO UNIT	CAUSES	SOURCE	PRIORITY	SIZE AFFECTED	UNIT	START DATE	END DATE
R	Clear Creek	304.120	Mercury	Resource Extraction	Medium	2	Miles	2001 [d]	2003
R	Espinosa Slough	309.100	Pesticides	Agriculture Urban Runoff/Storm Sewers	Medium	320	Acres	2001 [b]	2003
			Priority Organics	Nonpoint Source	Medium	320	Acres	2001 [b]	2003
			Nutrients	Agriculture Storm sewers	Medium	320	Acres	2001 [b]	2003
R	Gabilan Creek	309.700	Fecal Coliform	Urban Runoff Nonpoint Source Natural Sources	Medium [2]	4	Miles	2004 [h]	2015
R	Las Tablas Creek	309.810	Metals	Surface Mining	High	13	Miles	1997	2000
R	Las Tablas Creek, North Fork	309.810	Metals	Surface Mining	High	5	Miles	1997	2000
R	Las Tablas Creek, South Fork	309.810	Metals	Surface Mining	High	4	Miles	1997	2000

2001 CENTRAL COAST REGIONAL BOARD 303 (D) AND TMDL PRIORITY LIST

TYPE	WATER BODY NAME	HYDRO UNIT	CAUSES	SOURCE	PRIORITY	SIZE AFFECTED	UNIT	START DATE	END DATE
R	Llagas Creek	305.300	Nutrients	Municipal Point Sources Agriculture Irrigated Crop Production Pasture Land Agriculture-storm runoff Agriculture-irrigation tailwater Agricultural Return Flows Urban Runoff/Storm Sewers Habitat Modification Nonpoint Source Point Source	High	22	Miles	2000[e]	2005[f]
			Sedimentation/Siltation	Agriculture Hydromodification Habitat Modification	Medium	22	Miles	2000[e]	2005[f]
			Fecal Coliform	Pasture Land Nonpoint Source Natural Sources	Medium[2]	4	Miles	2004[h]	2015
			Chloride	Nonpoint Source Unknown Source	Medium[2]	1	Miles	2004[h]	2015
			Dissolved Oxygen	Nonpoint Source Unknown Source Point Source	Medium[2]	1	Miles	2004[h]	2015
			Sodium	Nonpoint Source Unknown Source	Medium[2]	1	Miles	2004[h]	2015
			Total Dissolved Solids	Nonpoint Source Unknown Source	Medium[2]	1	Miles	2004[h]	2015
R	Lompico Creek	304.120	Nutrients	Septage Disposal	High	5	Miles	1993	2000
			Sedimentation/Siltation	Construction/Land Development Natural Sources	High	5	Miles	1998	2000
			Pathogens	Septage Disposal Natural Sources Nonpoint Source	Medium	5	Miles	1999	2001

2001 CENTRAL COAST REGIONAL BOARD 303 (D) AND TMDL PRIORITY LIST

TYPE	WATER BODY NAME	HYDRO UNIT	CAUSES	SOURCE	PRIORITY	SIZE AFFECTED	UNIT	START DATE	END DATE
R	*Los Osos Creek*	*310.220*	~~*Priority Organics*~~	~~*Urban Runoff/Storm Sewers*~~	~~*High*~~	~~*10*~~	~~*Miles*~~	~~*2001*~~[4]	~~*2003*~~
			Nutrients	*Agriculture* *Irrigated Crop Production* *Agriculture-storm runoff* *Agricultural Return Flows*	*High*	*10*	*Miles*	*1996*	*2000*
			Sedimentation/Siltation	*Agriculture* *Irrigated Crop Production* *Range Land* *Upland Grazing* *Agriculture-storm runoff* *Hydromodification* *Channelization* *Dredging (Hydromod.)* *Habitat Modification* *Removal of Riparian Vegetation* *Streambank Modification/Destabilization* *Channel Erosion* *Erosion/Siltation* *Natural Sources* *Nonpoint Source*	*High*	*10*	*Miles*	*1996*	*1999*
			Dissolved Oxygen	*Agriculture* *Urban Runoff* *Pasture Lands* *Unknown Sources*	*High*[4]	*1*	*Miles*	*2003*[J]	*2015*
R	*Main Street Canal*	*312.100*	*Nitrate*	*Agriculture* *Nonpoint Source* *Urban Runoff*	*Medium*[1]	*6*	*Miles*	*2006*[1]	*2015*
R	*Mission Creek*	*315.320*	*Unknown Toxicity*	*Urban Runoff/Storm Sewers*	*Low*	*9*	*Miles*	*2006*	*2011*
			Pathogens	*Urban Runoff/Storm Sewers* *Septage Disposal*	*High*[3]	*9*	*Miles*	*2006*	*2011*
R	*Nipomo Creek*	*312.100*	*Fecal Coliform*	*Urban Runoff* *Agriculture* *Natural Sources*	*Medium*[1]	*5*	*Miles*	*2006*[1]	*2015*
R	*Orcutt Solomon Creek*	*312.100*	*Fecal Coliform*	*Pasture Lands* *Nonpoint Source* *Agriculture* *Natual Sources*	*Medium*[1]	*5*	*Miles*	*2006*[1]	*2015*

2001 CENTRAL COAST REGIONAL BOARD 303 (D) AND TMDL PRIORITY LIST

TYPE	WATER BODY NAME	HYDRO UNIT	CAUSES	SOURCE	PRIORITY	SIZE AFFECTED	UNIT	START DATE	END DATE
R	Pajaro River	305.100	Nutrients	Agriculture Irrigated Crop Production Agriculture-storm runoff Agriculture-subsurface drainage Agriculture-irrigation tailwater Agricultural Return Flows Urban Runoff/Storm Sewers Wastewater - land disposal Channelization Removal of Riparian Vegetation Nonpoint Source	High	49	Miles	2000[e]	2005[f]
			Sedimentation/Siltation	Agriculture Irrigated Crop Production Range Land Agriculture-storm runoff Resource Extraction Surface Mining Hydromodification Channelization Habitat Modification Removal of Riparian Vegetation Streambank Modification/Destabilization Channel Erosion Natural Sources	Medium	49	Miles	2000[e]	2005[f]
			Fecal Coliform	Pasture Lands Nonpoint Source Natural Sources	Medium[2]	5	Miles	2004[h]	2015
R	Quail Creek	309.200	Fecal Coliform	Pasture Lands Natural Sources Agriculture	Medium[2]	4	Miles	2004[h]	2015
R	Rider Gulch Creek	305.100	Sedimentation/Siltation	Agriculture Silviculture Construction/Land Development	Medium	2	Miles	2000[e]	2005[f]

2001 CENTRAL COAST REGIONAL BOARD 303 (D) AND TMDL PRIORITY LIST

TYPE	WATER BODY NAME	HYDRO UNIT	CAUSES	SOURCE	PRIORITY	SIZE AFFECTED	UNIT	START DATE	END DATE
R	Salinas Reclamation Canal	309.200	Pesticides	Minor Industrial Point Source Agriculture Irrigated Crop Production Agriculture-storm runoff Agriculture-irrigation tailwater Agricultural Return Flows Nonpoint Source	Medium	20	Miles	2001[b]	2005
			Priority Organics	Minor Industrial Point Source Agriculture Irrigated Crop Production Agriculture-storm runoff Agriculture-irrigation tailwater Agricultural Return Flows Urban Runoff/Storm Sewers Source Unknown Nonpoint Source	Medium	20	Miles	2001[b]	2005
			Fecal Coliform	Urban Runoff Pasture Lands Natural Sources Agriculture	Medium[2]	5	Miles	2004[b]	2015
R	Salinas River	309.100	Pesticides	Agriculture Irrigated Crop Production Agriculture-storm runoff Agriculture-irrigation tailwater Agricultural Return Flows Nonpoint Source	Medium	50	Miles	2001[b]	2003
			Nutrients	Agriculture	Medium	50	Miles	2001[b]	2007
			Sedimentation/Siltation	Agriculture Irrigated Crop Production Range Land Agriculture-storm runoff Road Construction Land Development Channel Erosion Nonpoint Source	Medium	90	Miles	2000[c]	2003
			Salinity/TDS/Chlorides	Agriculture	Medium	50	Miles	2001[b]	2005

2001 CENTRAL COAST REGIONAL BOARD 303 (D) AND TMDL PRIORITY LIST

TYPE	WATER BODY NAME	HYDRO UNIT	CAUSES	SOURCE	PRIORITY	SIZE AFFECTED	UNIT	START DATE	END DATE
R	Salinas River (Upper)	309.810	Chloride	Agriculture Urban Runoff Pasture Lands	Medium	25	Miles	2001[b]	2015
			Sodium	Agriculture Urban Runoff Pasture Lands	Medium	15	Miles	2001[b]	2015
R	San Antonio Creek (Santa Barbara Co)	315.310	Sedimentation/Siltation	Agriculture Nonpoint Source	Low	6	Miles	2006	2011
R	San Benito River	305.500	Sedimentation/Siltation	Agriculture Resource Extraction Nonpoint Source	Medium	86	Miles	2000[e]	2005[f]
R	San Lorenzo Creek	309.700	Fecal Coliform	Agriculture Urban Runoff Pasture Lands Natural Sources	Medium[2]	3	Miles	2004[h]	2015
R	San Lorenzo River	304.120	Nutrients	Septage Disposal Nonpoint Source	High	25	Miles	1993	2000
			Sedimentation/Siltation	Silviculture Construction/Land Development Land Development Urban Runoff/Storm Sewers	High	25	Miles	1998	2000
			Pathogens	Urban Runoff/Storm Sewers Septage Disposal	High	60	Miles	1999	2001
R	San Luis Obispo Creek (Below W. Marsh Street)	310.240	~~Priority Organics~~	~~Industrial Point Sources~~	~~Medium~~	9	~~Miles~~	~~2001[d]~~	~~2003~~
			PCB	Unknown Sources	Medium	9	Miles	2001[d]	2003
			Nutrients	Municipal Point Sources Agriculture Irrigated Crop Production Agriculture-storm runoff	High	9	Miles	1999[g]	2000
			Pathogens	Urban Runoff/Storm Sewers	High	9	Miles	1999[g]	2000

2001 CENTRAL COAST REGIONAL BOARD 303 (D) AND TMDL PRIORITY LIST

TYPE	WATER BODY NAME	HYDRO UNIT	CAUSES	SOURCE	PRIORITY	SIZE AFFECTED	UNIT	START DATE	END DATE
R	Santa Maria River	312.100	Fecal Coliform	Pasture Lands Urban Runoff Agriculture Natural Sources	Medium[1]	5	Miles	2006[1]	2015
			Nitrate	Urban Runoff Agriculture Pasture Lands	Medium[1]	3	Miles	2006[1]	2015
R	Santa Ynez River	314.000	Nutrients	Nonpoint Source	Low	70	Miles	2003	2007
			Sedimentation/Siltation	Agriculture Urban Runoff/Storm Sewers Resource Extraction	Low	70	Miles	2003	2007
			Salinity/TDS/Chlorides	Agriculture	Low	70	Miles	2003	2007
R	Shingle Mill Creek	304.120	Nutrients	Septage Disposal	High	2	Miles	1998	2001
			Sedimentation/Siltation	Construction/Land Development Nonpoint Source	High	2	Miles	1998	2001
R	Tembladero Slough	309.100	Pesticides	Agriculture Irrigated Crop Production Agriculture-storm runoff Agricultural Return Flows Nonpoint Source	Medium	150	Acres	2001[b]	2003
			Nutrients	Agriculture Irrigated Crop Production Agriculture-storm runoff Agricultural Return Flows Nonpoint Source	Medium	150	Acres	2001[b]	2003
			Fecal Coliform	Pasture Lands Urban Runoff Natural Sources Agriculture	Medium[2]	10	Miles	2004[h]	2015
R	Valencia Creek	304.130	Sedimentation/Siltation	Agriculture Construction/Land Development	Medium	7	Miles	2001	2005
			Pathogens	Agriculture Septage Disposal	Low	7	Miles	2006	2011

2001 CENTRAL COAST REGIONAL BOARD 303 (D) AND TMDL PRIORITY LIST

TYPE	WATER BODY NAME	HYDRO UNIT	CAUSES	SOURCE	PRIORITY	SIZE AFFECTED	UNIT	START DATE	END DATE
R	Waddell Creek, East	304.110	Nutrients	Municipal Point Sources	Medium	3	Miles	2001	2005
R	Watsonville Slough	305.100	Pesticides	Agriculture Irrigated Crop Production Agriculture-storm runoff Agriculture-irrigation tailwater Nonpoint Source	Medium	300	Acres	2001[d]	2003
			Metals	Agriculture Urban Runoff/Storm Sewers	Medium	300	Acres	2001[d]	2003
			Sedimentation/Siltation	Agriculture Irrigated Crop Production Agriculture-storm runoff Nonpoint Source	Medium	300	Acres	2000[e]	2005[f]
			Pathogens	Urban Runoff/Storm Sewers Source Unknown Nonpoint Source	Medium	300	Acres	2001[d]	2003
			Oil and grease	Urban Runoff/Storm Sewers Nonpoint Source	Medium	300	Acres	2001[d]	2003
C	Pacific Ocean at Arroyo Burro Beach	315.320	Pathogens	Urban Runoff/Storm Sewers Nonpoint Source	High[3]	6	Miles	2006	2011
C	Pacific Ocean at Arroyo Quemado Beach	315.100	Fecal Coliform	Pasture Lands Nonpoint Source Agriculture Natural Sources	High[3]	2	Miles	2006[l]	2015
			Total Coliform	Pature Lands Nonpoint Source Natural Sources Agriculture	High[3]	2	Miles	2006[l]	2015

2001 CENTRAL COAST REGIONAL BOARD 303 (D) AND TMDL PRIORITY LIST

TYPE	WATER BODY NAME	HYDRO UNIT	CAUSES	SOURCE	PRIORITY	SIZE AFFECTED	UNIT	START DATE	END DATE
C	Pacific Ocean at Jalama Beach	315.100	Fecal Coliform	Pasture Lands Nonpoint Source Natural Sources Agriculture	High[3]	1	Miles	2006[1]	2015
			Total Coliform	Pasture Lands Agriculture Nonpoint Source Natural Sources	High[3]	1	Miles	2006[1]	2015
C	Pacific Ocean at Mission Creek	315.310	Fecal Coliform	Urban Runoff Agriculture Nonpoint Source Natural Sources Unknown Sources	High[3]	5	Miles	2006[1]	2015
			Total Coliform	Urban Runoff Nonpoint Source Sources Unknown Agriculture	High[3]	5	Miles	2006[1]	2015
C	Pacific Ocean at Point Rincon	315.340	Pathogens	Urban Runoff/Storm Sewers Nonpoint Source	High[3]	3	Miles	2006	2011

Attachment Two

START AND END DATE FOOTNOTES

[a] No staff or budget in 1998, scheduled to start 2005

[b] No staff in 1998, part of the Salinas River TMDL Planning Unit; work initiated on Pesticides, Priority Organics, Nutrients, and Salinity in 2001.

[c] No staff in 1998, part of the Salinas River TMDL Planning Unit, work initiated on Siltation in 2000.

[d] No staff in 1998, work initiated in 2001.

[e] No staff in 1998; part of the Pajaro River Planning Unit; work initiated in 2000.

[f] Pajaro River Nutrients and Sedimentation/Siltation TMDL schedules are adjusted to coincide with the Sedimentation/Siltation TMDL contract efforts. Schedule leverages state funds to partner with existing efforts and research by others (UCSC), outreach by the Farm Bureau, and flood control efforts.

[g] Preliminary assessments completed prior to 1999 but TMDL development started in 1999.

[h] Scheduled to follow-up on initial Pajaro/Salinas work; current resources committed until 2004.

[i] Current resources committed until 2004; in order to integrate the TMDL with the existing schedules work can't be initiated until 2006.

[j] May be completed by 2003 as part of the Morro Bay Nutrient TMDL, otherwise current resources committed until 2004.

PRIORITY FOOTNOTES

[1] Santa Maria River Watershed waterbodies show high levels of nutrients and pathogens relative to other stations in the Region but are medium priority. This is because only CCAMP data is avaliable. Additionally, there are limited watershed efforts (such as planning, monitoring and assessment) in place to facilitate TMDL development. Furthermore, the Santa Maria River watershed was not one of the top priority watersheds determined by the Regional Board per the Watershed Management Initiative.

[2] Pajaro River Watershed waterbodies for nutrients, coliform and dissolved oxygen are a medium priority because we only have CCAMP data accessible and levels indicate moderate impairment. Additionally, Pajaro was not one of the original top priority watersheds determined by the Regional Board per the Watershed Management Initiative. Salinas River Watershed waterbodies for nutrients, coliform and dissolved oxygen are also medium priority, even though it was one of the original top priority watersheds per the Watershed Management Initiative, because only CCAMP data is available. A significant data collection, modelling or other water quality research effort is still necessary to develop TMDLs for these constituents for a watershed as extensive as Salinas River.

[3] Santa Barbara/South Coast Watersheds were made higher priority due to increased attention on beach closures. Data collection efforts completed (county, CCAMP) reveal multiple exceedences of standards. Many of these beaches are the focus of the Clean Beaches Initiative.

[4] This was made high to coincide with Morro Bay Nutrients TMDL.

7/10/01 - KC
DJ
JS return time
allow
a[?]/22/01

Dear Pavlova Vitale (RB 8) & Keri Cole (RB 9)

Whereas I have spoken w/ both of you regarding preparations for the upcoming 303(d) listing process, it seems appropriate to keep communicating and providing additional information. I hope to maintain this as a "two-way street", that is, you should feel free to share your thoughts w/ me too. You should also be communicating w/ each other and other RB staff. The overall goal is two-fold: a) seek at others to be sure to avoid mistakes b) discuss matters to have some consistent statewide standards.

Enclosed is 1997 memo from TMDL workgroup pertaining to procedures and recommendations for 1998 list. It may seem odd to provide you with such an old document however, we feel it has some useful insights and could be used as a "starting point." Please pay close attention to item C #3 which describes delisting based on faulty data. Also, scheduling and targeting involves year timeframes and this can reshuffle the deck from 1998 list.

Also enclosed is draft listing and delisting guidance from State of Florida. This has some interesting concepts which may be worth considering. First and foremost, they have clarified a "credible data" requirement for listing. Second, they have proposed some minimum sample sizes to help reduce decision errors. You are not required to follow Florida rather it seems worth sharing.

Finally, there is an effort to gather folks like yourselves from each RB & SB to convene here in S.F. I don't know details

So this is head's up information for you & your colleagues. I suspect it would serve to create common grounds and allow for some agreement by all RB, much like the TMDL listing work group that convened twice in 1997. You will be the first to hear of it, assuming this effort continues.

Finally, I wish to offer my assistance in whatever way I can. As you both know, I have completed an assessment of Newport Bay & watershed so I know something about the listing & de-listing process you are going through. If you wish to discuss issues w/ me or verify your technical information please don't hesitate to call.

Respectfully,

Peter Kozelka

Listing Guidelines

1998 CLEAN WATER ACT (CWA) SECTION 303(d)
LISTING GUIDELINES FOR CALIFORNIA
(August 11, 1997)

A. Introduction

The Total Maximum Daily Load (TMDL) Workgroup[1] identified the need to develop statewide consistency on 303(d) listing issues. At its roundtable meeting on April 30, 1997, the workgroup decided to develop 303(d) listing guidelines that would be acceptable to the Regional Water Quality Control Boards (RWQCB), State Water Resources Control Board (SWRCB), and U.S. Environmental Protection Agency (U.S. EPA). Three work teams were formed to address various 303(d) listing issues. Each team met several times to develop a draft work team product. The work team products were circulated for comment from the TMDL workgroup and the drafts were revised by the work teams. The TMDL workgroup held a second roundtable meeting on July 28, 1997 to review the integrated product of the three work teams, and revisions to the listing guidelines were made (a list of attendees at the TMDL roundtable meetings and work team members is attached).

The guidelines address the following topics: listing/delisting factors, scheduling and prioritization, public notice procedures, the 303(d) list submittal package, and coordination with the Watershed Management Initiative (WMI).

B. Listing Factors

The following factors were developed to provide for consistent statewide decisions on listing California surface water bodies under CWA Section 303(d). However, they are meant to be flexible, and the RWQCBs should exercise judgment based on the specific circumstances for each water body. The listing factors will be reviewed periodically and may be revised to reflect new scientific information or newly developed water quality criteria (e.g., sediment criteria,

[redacted]

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[1] An ad hoc workgroup of staff from the Regional Water Quality Control Boards, State Water Resources Control Board, and U.S. EPA that have an interest in 303(d) issues.

criteria for evaluation of wetland functions). Information sources which should be considered include sources listed in 40 CFR 130.7(b)(5) and sources found in Appendix D of the 1996 305(b) Guidance from U.S. EPA.

Water bodies may be listed if any one of these factors is met[2]:

1. Effluent limitations or other pollution control requirements [e.g., Best Management Practices (BMPs)] are not stringent enough to assure protection of beneficial uses and attainment of SWRCB and RWQCB objectives, including those implementing SWRCB Resolution Number 68-16 "Statement of Policy with Respect to Maintaining High Quality of Waters in California" [see also 40 CFR 130.7(b)(1)].

2. Fishing, drinking water, or swimming advisory currently in effect. This does not apply to advisories related to discharge in violation of existing WDR's or NPDES permit.

3. Beneficial uses are impaired or are expected to be impaired within the listing cycle (i.e. in next two years). Impairment is based upon evaluation of chemical, physical, or biological integrity. Impairment will be determined by "qualitative assessment"[3], physical/chemical monitoring, bioassay tests, and/or other biological monitoring. Applicable Federal criteria and RWQCB Water Quality Control Plans determine the basis for impairment status.

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[2] U. S. EPA's national policy is that water bodies impaired by natural conditions should be listed. In light of this policy, the RWQCBs should consider designating such water bodies as a low priority for establishing TMDLs.

[3] Qualitative Assessment: An assessment based upon information other than ambient monitoring data. Information used may include land use data, water quality impacts, predictive modeling using estima[illegible] variables, or fish and game biologist surveys. A sole reliance on professional judgment, literature statements (often judgment based), or public comments should not be the only basis for listing.

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4. The water body is on the previous 303(d) list and either: (a) "monitored assessment"[4] continues to demonstrate a violation of objective(s) or (b) "monitored assessment" has not been performed.

5. Data indicate tissue concentrations in consumable body parts of fish or shellfish exceed applicable tissue criteria or guidelines. Such criteria or guidelines may include SWRCB Maximum Tissue Residue Level values, FDA Action Levels, NAS Guidelines, and U.S. EPA tissue criteria for the protection of wildlife as they become available.

6. The water quality is of such concern that the RWQCB determines the water body needs to be afforded a level of protection offered by a 303(d) listing.

C. Delisting Factors

Water bodies may be delisted for specific pollutants or stressors if any one of these factors is met:

1. Objectives are revised (for example, Site Specific Objectives), and the exceedence is thereby eliminated.

2. A beneficial use is de-designated after U.S. EPA approval of a Use Attainability Analysis, and the non-support issue is thereby eliminated.

3. Faulty data led to the initial listing. Faulty data include, but are not limited to, typographical errors, improper quality assurance/quality control (QA/QC) procedures, or Toxic Substances Monitoring/State Mussel Watch EDLs which are not confirmed by risk assessment for human consumption.

4. It has been documented that the objectives are being met and beneficial uses are not impaired based upon "Monitored Assessment" criteria.

[redacted]

[4] Monitored Assessment: For aquatic life uses, monitored assessment should be based upon a minimum of Level 2 information, as indicated in the 1996 305(b) guidance [Guidelines for Preparation of the 1996 State Water Quality Assessments ("305(b) Reports"), EPA 841 B-95-001, May 1995; Pages 5-6 through 5-10, Tables 5-2 & 5-3]. There is a need to develop guidance for Minimum Data Requirements for assessing other beneficial uses.

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5. A TMDL has been approved by the U.S. EPA.

6. There are control measures in place which will result in protection of beneficial uses. Control measures include permits, clean up and abatement orders, and watershed management plans which are enforceable and include a time schedule.

D. Priority Ranking, Targeting, and Scheduling

Priority Ranking

A priority ranking should be provided for listed waters to guide TMDL planning pursuant to 40 CFR 130.7. RWQCBs should apply the following criteria in ranking TMDLs in high (H), medium (M), and low (L) priority categories:

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

- degree of impairment or threat (such as number of pollutants/stressors of concern, and number of beneficial uses impaired or threatened)

- conformity with related activities in the watershed (such as existence of watershed assessment, planning, pollution control, and remediation, or restoration efforts in the area)

- potential for beneficial use protection or recovery

- degree of public concern

- available information

[redacted]

All water bodies should be ranked in one of the three categories (H, M and L) . Not all high priority waters need to be targeted in the next two years for TMDLs.

Scheduling and Targeting

Schedules for starting, completing and submitting TMDLs should be provided for all listed waters/pollutants pursuant to 40 CFR 130.7(d)(1). The schedules should provide for submittal of all TMDLs for all listed waters/pollutants on the 1998 list. Given the difficulty of estimating TMDL development time frames, RWQCBs should make best estimates based on TMDL resource planning efforts being conducted pursuant to the WMI process. The schedules should be presented in three levels to reflect degree of certainty regarding the attainability of the schedules.

Level 1: Next Two Years: Some waters should be targeted for TMDL development over the next two years pursuant to 40 CFR 130.7. Waters should be targeted in cases where substantial work on TMDL development is expected during the next two years, even if the TMDL is not scheduled for completion until after the next two years. The schedules for targeted waters should be consistent with the RWQCB's WMI planning chapter. The rationale for targeting a particular set of waters should be documented.

Level 2: Five Year Time Frame: RWQCBs should provide schedules for TMDLs to be initiated over the next five years, resource needs for which should be reflected in the RWQCB's WMI planning chapter (see section G) and addressed in WMI resource allocation decision-making. Schedules should be based on those TMDL activities for which RWQCBs are actively seeking funding support and should include TMDLs for which funding is reasonably likely to become available through other state, federal, or third party (e.g., discharger) sources.

Level 3: Years 5-13: RWQCBs should provide tentative schedules for completing TMDLs for the remaining waters over a period not to exceed 13 years. Schedules should be based on those TMDL activities for which RWQCBs are planning to seek funding support, with appropriate caveats stating that these provisional schedules are dependent on resource availability and further evaluation of TMDL applicability and feasibility.

E. Public Notice Procedures

At a minimum, each RWQCB shall conduct the following public participation activities:

1. Provide a 30-day comment period with public notice of the proposed 303(d) list. The RWQCB should consider the following options to fulfill the public notice requirements:

   Option A. RWQCB workshop and adoption of the draft 303(d) list at a public hearing

   The RWQCB may conduct a workshop to consider the draft 303(d) list followed by a public hearing to adopt the 303(d) list. A 30-day public notice shall be provided for the workshop and 45-day public notice shall be provided for the public hearing. Written comments should be submitted 15 days prior to the public hearing.

   Option B. RWQCB adoption of the draft 303(d) list at a regular Board meeting

   The RWQCB may adopt the 303(d) list at a regular Board meeting. A 30-day public notice of the RWQCB's intent to consider adoption of the draft 303(d) list, TMDL priority ranking and scheduling should be provided. The public notice shall solicit written comments on the draft 303(d) list. Written comments should be submitted 7 days prior to the RWQCB meeting.

   Option C. RWQCB adoption of the draft 303(d) list at a public hearing (no workshop)

   The RWQCB may adopt the 303(d) list at a duly noticed public hearing (45-day public notice). The public notice shall solicit written comments on the draft 303(d) list. Written comments should be submitted 15 days prior to the RWQCB meeting.

2. Prepare a responsiveness summary (40 CFR part 25) responding to all written comments on the draft 303(d) list received by the cut-off date.

The RWQCB should consider the following:

Provide 90-day public notice of RWQCB's intent to consider revisions to 303(d) list, establish TMDL priority ranking and development schedule. This notice should outline the criteria used for listing decisions and which watersheds will be assessed in this listing cycle. The notice shall solicit information, data, and other relevant factors to assist RWQCB staff in the preparation of the draft 303(d) list and TMDL priority ranking/schedule.

F. 303(d) List Submittal Package

At a minimum, each RWQCB should submit to the SWRCB the following information with the 303(d) list submittal:

1. 303(d) list of water bodies (referenced on maps, if feasible), pollutant or stressors, pollutant sources, extent of impairment (e.g. miles of stream, acres of estuary), TMDL priority ranking and schedule for TMDL development for all listed water bodies by the RWQCB; and

2. list of water bodies and associated watersheds (referenced on maps, if feasible) which were assessed in the current cycle; and

3. factors used to list or delist specific waterbodies (see sections B and C). Criteria used to prioritize TMDL development (see section D.1.). Criteria used to generate TMDL development schedules (see section D.2.); and

4. documentation for TMDL priority ranking and scheduling decisions, which may include an estimate of resource needs for high priority water bodies for TMDL development; and

5. documentation of the public participation process

   a. public notice(s)
   b. responsiveness summary; and

6. list of RWQCB file(s) which contain the individual water body assessment data, information, etc. upon which the listing decision was made (note: a RWQCB may choose to submit the data assessment information in lieu of the minimum list of files to the SWRCB as part of the submittal package. This may be warranted for some water bodies where there is significant controversy).

G. Coordination with the Watershed Management Initiative (WMI)

RWQCBs should conduct the 303(d) assessment consistent with each region's schedule outlined in the WMI chapter for updating the Water Quality Assessment (WQA). The WQA includes the 303(d) listing. The TMDL priority ranking and scheduling shall also be consistent with the WMI chapter. In order to assure this consistency, each RWQCB should:

1. include the 303(d) listing/review schedule for each watershed in the regions' WMI chapter; <u>and</u>

2. include the TMDL priority ranking and scheduling in the regions' WMI chapter; <u>and</u>

3. include resource allocation projections for conducting the 303(d) listing assessment in the regions' WMI chapter.

4. in cases where the RWQCB focused the 303(d) listing/review on a subset of watersheds in the region, public comments on water bodies outside of targeted watersheds will be directed to the WMI process for prioritization.

FL Listing / Delisting ~~Metho~~ Regs

CHAPTER 62-303

IDENTIFICATION OF IMPAIRED SURFACE WATERS

PART I

GENERAL

62-303.100 Scope and Intent.

(1) This chapter establishes a methodology to identify surface waters of the state that will be included on the state's planning list of waters that will be assessed pursuant to subsections 403.067(2) and (3), Florida Statutes (F.S.). It also establishes a methodology to identify impaired waters that will be included on the state's verified list of impaired waters, for which the Department will calculate Total Maximum Daily Loads (TMDLs), pursuant to subsection 403.067(4), F.S., and which will be submitted to the United States Environmental Protection Agency (EPA) pursuant to ~~sub~~paragraph 303(d)(1)~~(C)~~ of the Clean Water Act (CWA).

(2) Subsection 303(d) of the CWA and section 403.067, F.S., describe impaired waters as those not meeting applicable water quality standards, which is a broad term that includes designated uses, water quality criteria, the Florida antidegradation policy, and moderating provisions. However, as recognized when the water quality standards were adopted, many water bodies naturally do not meet one or more established water quality criteria at all times, even though they meet their designated use. Data on exceedances of water quality criteria will provide critical information about the status of assessed waters, but it is the intent of this chapter to only list waters on the verified list that are impaired due to point source or nonpoint source pollutant discharges. It is not the intent of this chapter to include waters that do not meet water quality criteria solely due to natural conditions or physical alterations of the water body not related to pollutants. Similarly, it is not the intent of this chapter to include waters where designated uses are being met and where water quality criteria exceedances are limited to those parameters for which permitted mixing zones or other moderating provisions (such as site-specific alternative criteria) are in effect. Waters that do not meet applicable water quality standards due to natural conditions or to pollution not related to pollutants shall be noted in the state's water quality assessment prepared under subsection 305(b) of the CWA [305(b) Report].

(3) This chapter is intended to interpret existing water quality criteria and evaluate attainment of established designated uses as set forth in Chapter 62-302, F.A.C., for the purposes of identifying water bodies or segments for which TMDLs will be established. It is not the intent of this chapter to establish new water quality criteria or standards, or to determine the applicability of existing criteria under other provisions of Florida law. In cases where this

chapter relies on numeric indicators of ambient water quality as part of the methodology for determining whether existing narrative criteria are being met, these numeric values are intended to be used only in the context of developing a planning list and identifying an impaired water pursuant to this chapter. As such, exceedances of these numeric values shall not, by themselves, constitute violations of Department rules that would warrant enforcement action.

(4) Nothing in this rule is intended to limit any actions by federal, state, or local agencies, affected persons, or citizens pursuant to other rules or regulations.

(5) Pursuant to section 403.067, F.S., impaired waters shall not be listed on the verified list if reasonable assurance is provided that, as a result of existing or proposed technology-based effluent limitations and other pollution control programs under local, state, or federal authority, they will attain water quality standards in the future and reasonable progress towards attainment of water quality standards will be made by the time the next 303(d) list is scheduled to be submitted to EPA.

Specific Authority 403.061, 403.067, FS.

Law Implemented 403.021(11), 403.062, 403.067, FS.

History -- New __________.

62-303.150 Relationship Between Planning and Verified Lists.

(1) The Department shall follow the methodology in Section 62-303.300 to develop a planning list pursuant to subsection 403.067(2), F.S. As required by subsection 403.067(2), F.S., the planning list shall not be used in the administration or implementation of any regulatory program, and shall be submitted to EPA for informational purposes only. Waters on this planning list will be assessed pursuant to subsection 403.067(3), F.S., as part of the Department's watershed management approach. During this assessment, the Department shall determine whether the water body is impaired and whether the impairment is due to pollutant discharges using the methodology in Part III. The resultant verified list of impaired waters, which is the list of waters for which TMDLs will be developed by the Department pursuant to subsection 403.067(4), will be adopted by Secretarial Order and will be subject to challenge under subsection 120.569 and 120.57, F.S. Once adopted, the list will be submitted to the EPA pursuant to ~~sub~~paragraphs 303(d)(1)~~(A) and (C)~~ of the CWA.

(2) Consistent with state and federal requirements, opportunities for public participation, including workshops, meetings, and periods to submit comments on draft lists, will be provided as part of the development of planning and verified lists.

Specific Authority 403.061, 403.067, FS.

Law Implemented 403.062, 403.067, FS.

History -- New ________.

62-303.200 Definitions.

As used in this chapter:

(1) "BioRecon" shall mean a bioassessment conducted following the procedures outlined in "Protocols for Conducting a Biological Reconnaissance in Florida Streams," Florida Department of Environmental Protection, March 13, 1995, which is incorporated by reference.

(2) "Clean techniques" shall mean those applicable field sampling procedures and analytical methods referenced in "Method 1669: Sampling Ambient Water for Trace Metals at EPA Water Quality Criteria Levels, July 1996, USEPA, Office of Water, Engineering and Analysis Division, Washington, D.C.," which is incorporated by reference.

(3) "Department" or "DEP" shall mean the Florida Department of Environmental Protection.

(4) "Designated use" shall mean the present and future most beneficial use of a body of water as designated by the Environmental Regulation Commission by means of the classification system contained in Chapter 62-302, F.A.C.

(5) "Estuary" shall mean predominantly marine regions of interaction between rivers and nearshore ocean waters, where tidal action and river flow mix fresh and salt water. Such areas include bays, mouths of rivers, and lagoons.

(6) "Impaired water" shall mean a water body or water body segment that does not meet its applicable water quality standards as set forth in Chapters 62-302 and 62-4, F.A.C. as determined by the methodology in Part III of this chapter, due in whole or in part to discharges of pollutants from point or nonpoint sources.

(7) "Lake Condition Index" shall mean the benthic macroinvertebrate component of a bioassessment conducted following the procedures outlined in "Development of Lake Condition Indexes (LCI) for Florida," Florida Department of Environmental Protection, July, 2000, which is incorporated by reference.

(8) "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody or on historical pre-alteration data.

(9) "Nuisance species" shall mean species of flora or fauna whose noxious characteristics or presence in sufficient number, biomass, or areal extent may reasonably be expected to prevent, or unreasonably interfere with, a designated use of those waters.

(10) "Physical alterations" shall mean human-induced changes to the physical structure of the water body.

(11) "Planning list" shall mean the list of surface waters or segments for which assessments will be conducted to evaluate whether the water is impaired and a TMDL is needed, as provided in subsection 403.067(2), F.S.

(12) "Pollutant" shall be as defined in subsection 502(6) of the CWA. Characteristics of a discharge, including dissolved oxygen, pH, or temperature, shall also be defined as pollutants if they result or may result in the potentially harmful alteration of downstream waters.

(13) "Pollution" shall be as defined in subsection 502(19) of the CWA and subsection 403.031(2), F.S.

(14) "Predominantly marine waters" shall mean surface waters in which the chloride concentration at the surface is greater than or equal to 1,500 milligrams per liter.

(15) "Secretary" shall mean the Secretary of the Florida Department of Environmental Protection.

(16) "Spill" shall mean a short-term, unpermitted discharge to surface waters, not to include sanitary sewer overflows or chronic discharges from leaking wastewater collection systems.

(17) "Stream" shall mean a free-flowing, predominantly fresh surface water in a defined channel, and includes rivers, creeks, branches, canals, freshwater sloughs, and other similar water bodies.

(18) "Stream Condition Index" shall mean a bioassessment conducted following the procedures outlined in "Development of the Stream Condition Index (SCI) for Florida," Florida Department of Environmental Protection, May, 1996, which is incorporated by reference.

(19) "Surface water" means those waters of the State upon the surface of the earth to their landward extent, whether contained in bounds created naturally or artificially or diffused. Water from natural springs shall be classified as surface water when it exits from the spring onto the earth's surface.

~~(20) "Tier 2 Data Quality Assessment" shall mean an assessment of the quality controls used in generating water quality data, as outlined in the Department's Guidance Document, "A Tiered Approach to Data Quality Assessment" (DEP EAS 001-00, October 2000), which is incorporated by reference.~~

(20~~1~~) "Total maximum daily load" (TMDL) for an impaired water body or water body segment shall mean the sum of the individual wasteload allocations for point sources and the load allocations for nonpoint sources and natural background. Prior to determining individual wasteload allocations and load allocations, the maximum amount of a pollutant that a water body or water segment can assimilate from all sources without exceeding water quality standards must first be calculated. A TMDL shall include either an implicit or explicit margin of safety and a consideration of seasonal variations.

(21~~2~~) "Verified list" shall mean the list of impaired water bodies or segments for which TMDLs will be calculated, as provided in subsection 403.067(4), F.S., and which will be submitted to EPA pursuant to ~~sub~~paragraph 303(d)(1)~~(C)~~ of the CWA.

(22~~3~~) "Water quality criteria" shall mean elements of State water quality standards, expressed as constituent concentrations, levels, or narrative statements, representing a quality of water that supports the present and future most beneficial uses.

(23~~4~~) "Water quality standards" shall mean standards composed of designated present and future most beneficial uses (classification of waters), the numerical and narrative criteria applied to the specific water uses or classification, the Florida antidegradation policy, and the moderating provisions (mixing zones, site-specific alternative criteria, and exemptions) contained in Chapter 62-302, F.A.C., and in Chapter 62-4, F.A.C., adopted pursuant to Chapter 403, F.S.

(24~~5~~) "Water segment" shall mean a portion of a water body that the Department will assess and evaluate for purposes of determining whether a TMDL will be required. Water segments previously evaluated as part of the Department's 1998 305(b) Report are depicted in the map titled "Water Segments of Florida," which is incorporated by reference.

(25~~6~~) "Waters" shall be those surface waters described in Section 403.031(13), Florida Statutes.

Specific Authority 403.061, 403.067, FS.
Law Implemented 403.062, 403.067, FS.
History -- New ________.

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PART II

THE PLANNING LIST

62-303.300 Methodology to Develop the Planning List.

(1) This part establishes a methodology for developing a planning list of waters to be assessed pursuant to subsections 403.067(2) and (3), F.S. A waterbody shall be placed on the planning list if it fails to meet the minimum criteria for surface waters established in Rule 62-302.500, F.A.C.; any of its designated uses, as described in this part; or applicable water quality

criteria, as described in this part. It should be noted that water quality criteria are designed to protect either aquatic life use support, which is addressed in sections 62-303.310-353, or to protect human health, which is addressed in sections 62-303.360-380.

(2) Waters on the list of water segments submitted to EPA in 1998 that do not meet the data sufficiency requirements for the planning list shall nevertheless be included in the state's initial planning list developed pursuant to this rule.

Specific Authority 403.061, 403.067, FS.
Law Implemented 403.062, 403.067, FS.
History -- New .

62-303.310 Evaluation of Aquatic Life Use Support.

A Class I, II, or III water shall be placed on the planning list for assessment of aquatic life use support (propagation and maintenance of a healthy, well-balanced population of fish and wildlife) if, based on sufficient quality and quantity of data, it:

(1) exceeds applicable aquatic life-based water quality criteria as outlined in section 62-303.320,

(2) does not meet biological assessment thresholds for its water body type as outlined in section 62-303.330,

(3) is acutely or chronically toxic as outlined in section 62-303.340, or

(4) exceeds nutrient thresholds as outlined in section 62-303.350.

Specific Authority 403.061, 403.067, FS.
Law Implemented 403.062, 403.067, FS.
History -- New .

62-303.320 Exceedances of Aquatic Life-Based Water Quality Criteria.

(1) Water segments shall be placed on the planning list if, using objective and credible data, as defined by the requirements specified in this section, the number of exceedances of an applicable water quality criterion due to pollutant discharges is greater than or equal to the number listed in Table 1 for the given sample size. This table provides the number of exceedances that indicate a minimum of a 10% exceedance frequency with a minimum of an 80% confidence level using a binomial distribution.

over
10 yr. period

Table 1: Planning List

Minimum number of measured exceedances needed to put a water on the Planning list with at least 80% confidence that the actual exceedance rate is greater than or equal to ten percent.					
Sample sizes		Are listed if they have at least this # of exceedances	Sample sizes		Are listed if they have at least this # of exceedances
From	To		From	To	
10	15	3	246	255	30
16	23	4	256	264	31
24	31	5	265	273	32
32	39	6	274	282	33
40	47	7	283	292	34
48	56	8	293	301	35
57	65	9	302	310	36
66	73	10	311	320	37
74	82	11	321	329	38
83	91	12	330	338	39
92	100	13	339	348	40
101	109	14	349	357	41
110	118	15	358	367	42
119	126	16	368	376	43
127	136	17	377	385	44
137	145	18	386	395	45
146	154	19	396	404	46
155	163	20	405	414	47
164	172	21	415	423	48
173	181	22	424	432	49
182	190	23	433	442	50
191	199	24	443	451	51
200	208	25	452	461	52
209	218	26	462	470	53
219	227	27	471	480	54
228	236	28	481	489	55
237	245	29	490	499	56
			500	500	57

1

(2) The U.S. Environmental Protection Agency's Storage and Retrieval (STORET) database shall be the primary source of data used for determining water quality criteria exceedances. As required by rule 62-40.540(3), F.A.C., the Department, other state agencies, the Water Management Districts, and local governments collecting surface water quality data in Florida shall enter the data into STORET within one year of collection. Other sampling entities that want to ensure their data will be considered for evaluation should ensure their data are entered into STORET. The Department shall consider data submitted to the Department from other sources and databases if the data meet the sufficiency and data quality requirements of this section.

(3) When determining water quality criteria exceedances, data older than ten years shall not be used to develop planning lists. Further, more recent data shall take precedence over older data if:

(a) the newer data indicate a change in water quality and this change is related to changes in pollutant loading to the watershed or improved pollution control mechanisms in the watershed contributing to the assessed area, or

(b) the Department determines that the older data do not meet the data quality requirements of this section or are no longer representative of the water quality of the segment.

The Department shall note for the record that the older data were excluded and provide details about why the older data were excluded.

(4) To be assessed for water quality criteria exceedances using Table 1, a water segment shall have a minimum of ten, temporally independent samples for the ten year period. *To be treated as an independent sample, samples from a given station shall be at least one week apart.* Samples collected at the same location less than seven days apart shall be considered as one sample, with the median value used to represent the sampling period. However, if any of the individual values exceed acutely toxic levels, then the worst case value shall be used to represent the sampling period. The worst case value is the minimum value for dissolved oxygen, both the minimum and maximum for pH, or the maximum value for other parameters. However, when data are available from diel or depth profile studies, the lower tenth percentile value shall be used to represent worst case conditions. For the purposes of this chapter, samples collected within 200 meters of each other will be considered the same station or location, unless there is a tributary, an outfall, or significant change in the hydrography of the water. Data from different stations within a water segment shall be treated as separate samples even if collected at the same time. However, there shall be at least five independent sampling events during the ten year assessment period, with at least one sampling event conducted in

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three of the four seasons of the calendar year. For the purposes of this chapter, the four seasons shall be January 1 through March 31, April 1 through June 30, July 1 through September 30, and October 1 through December 31.

(5) Notwithstanding the requirements of paragraph (4), water segments shall be included on the planning list if:

(a) there are less than ten samples for the segment, but there are three or more temporally independent exceedances of an applicable water quality criterion, or

(b) there are more than one exceedance of an acute toxicity-based water quality criterion in any three year period.

(6) Values that exceed possible physical or chemical measurement constraints (pH greater than 14, for example) or that represent data transcription errors shall be excluded from the assessment. Outliers identified through statistical procedures shall be evaluated to determine whether they represent valid measures of water quality. If the Department determines that they are not valid, they shall be excluded from the assessment. However, the Department shall note for the record that the data were excluded and explain why they were excluded.

(7) The Department shall consider all readily available water quality data. However, to be used to determine water quality exceedances,

(a) data shall be collected and analyzed in accordance with Chapter 62-160, F.A.C., and

(b) for data collected after one year from the effective date of this rule, the sampling agency must provide to the Department, either directly or through entry into STORET, all of the ~~associated quality assurance~~ data quality assessment elements listed in Table 2 of the Department's Guidance Document "Data Quality Assessment Elements for Identification of Impaired Surface Waters" (DEP EAS 01-01, April 2001), which is incorporated by reference. ~~needed for a Tier 2 data quality assessment, with appropriate data fields entered into STORET.~~

(8) To be used to determine exceedances of metals criteria,

(a) surface water data for mercury shall be collected and analyzed using clean sampling and analytical techniques, and

(b) the corresponding hardness value shall be required to determine exceedances of freshwater metals criteria that are hardness dependent, and if the ambient hardness value is less than 25 mg/L as $CaCO_3$, then a hardness value of 25 will be used to calculate the criteria.

If data are not used due to sampling or analytical techniques or because hardness data were not available, the Department shall note for the record that data were excluded and explain why they were excluded.

(9) Surface water data with values below the applicable practical quantification limit (PQL) or method detection limit (MDL) shall be assessed in accordance with Rules 62-4.246(6)(b)-(d) and (8), F.A.C.

(a) If sampling entities want to ensure that their data will be considered for evaluation, they should review the Department's list of approved MDLs and PQLs developed pursuant to Rule 62-4.246, F.A.C., and, if available, use approved analytical methods with MDLs below the applicable water quality criteria. If there are no approved methods with MDLs below a criterion, then the method with the lowest MDL should be used. Analytical results listed as below detection or below the MDL shall not be used for developing planning lists if the MDL was above the criteria and there were, at the time of sample collection, approved analytical methods with MDLs below the criteria on the Department's list of approved MDLs and PQLs.

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(b) If appropriate analytical methods were used, then data with values below the applicable MDL will be deemed to meet the applicable water quality criterion and data with values between the MDL and PQL will be deemed to be equal to the MDL.

(10) It should be noted that the data requirements of this rule constitute the minimum data set needed to assess a water segment for impairment. Agencies or groups designing monitoring networks are encouraged to consult with the Department to determine the sample design appropriate for their specific monitoring goals.

Specific Authority 403.061, 403.067, FS.
Law Implemented 403.062, 403.067, FS.
History -- New ________.

62-303.330 Biological Assessment.

(1) Biological data must meet the requirements of paragraphs (3) and (7) in section 62-303.320.

(2) Bioassessments used to assess streams and lakes under this rule shall include BioRecons, Stream Condition Indices (SCIs), and the benthic macroinvertebrate component of the Lake Condition Index (LCI), which only applies to clear lakes with a color less than 204~~0~~ platinum cobalt units. Because these~~of the complexity of~~ bioassessment procedures require specific training and expertise, persons conducting the bioassessments must comply with ~~will, in addition to meeting~~ the quality assurance requirements of Chapter 62-160, F.A.C., attend at least eight hours of Department sanctioned field training, and ~~be required to~~ pass a Department sanctioned field audit that verifies the sampler follows the applicable SOPs in Chapter 62-160, F.A.C., before their bioassessment data will be considered valid for use under this rule.–

(3) Water segments with at least one failed bioassessment or one failure of the

biological integrity standard, Rule 62-302.530(11), shall be included on the planning list for assessment of aquatic life use support.

(a) In streams, the bioassessment can be an SCI or a BioRecon. Failure of a bioassessment for streams consists of a "poor" or "very poor" rating on the Stream Condition Index, or not meeting the minimum thresholds established for all three metrics (taxa richness, Ephemeroptera/Plecoptera/Tricoptera Index, and Florida Index) on the BioRecon.

(b) Failure for lakes consists of a "poor" or "very poor" rating on the Lake Condition Index.

(4) Other information relevant to the biological integrity of the water segment, including information about alterations in the type, nature, or function of a water, shall also be considered when determining whether aquatic life use support has been maintained.

Specific Authority 403.061, 403.067, FS.
Law Implemented 403.062, 403.067, FS.
History -- New ________.

62-303.340 Toxicity.

(1) All toxicity tests used to place a water segment on a planning list shall be based on surface water samples in the receiving water body and shall be conducted and evaluated in accordance with Chapter 62-160, F.A.C., and subsections 62-302.200(1) and (4), F.A.C., respectively.

(2) Water segments with two samples indicating acute toxicity within a twelve month period shall be placed on the planning list. Samples must be collected at least two weeks apart over a twelve month period, some time during the ten years preceding the assessment.

(3) Water segments with two samples indicating chronic toxicity within a twelve month period shall be placed on the planning list. Samples must be collected at least two weeks apart, some time during the ten years preceding the assessment.

Specific Authority 403.061, 403.067, FS.
Law Implemented 403.062, 403.067, FS.
History -- New ________.

62-303.350 Interpretation of Narrative Nutrient Criteria.

(1) Trophic state indices (TSIs) and annual mean chlorophyll a values shall be the primary means for assessing whether a water should be assessed further for nutrient impairment. Other information indicating an imbalance in flora or fauna due to nutrient enrichment, including, but not limited to, algal blooms, excessive macrophyte growth, decrease in the distribution (either in density or areal coverage) of seagrasses or other submerged aquatic

vegetation, changes in algal species richness, and excessive diel oxygen swings, shall also be considered.

(2) To be used to determine whether a water should be assessed further for nutrient enrichment,

(a) data must meet the requirements of paragraphs (2)-(4), (6), and (7) in rule 62-303.320,

(b) at least one sample from each season shall be required in any given year to calculate a Trophic State Index (TSI) or an annual mean chlorophyll a value for that year, and

(c) there must be annual means from at least four years, when evaluating the change in TSI over time pursuant to paragraph 62-303.352(3).

(3) When comparing changes in chlorophyll a or TSI values to historical levels, historical levels shall be based on the lowest five-year average for the period of record. To calculate a five-year average, there must be annual means from at least three years of the five-year period.

Specific Authority 403.061, 403.067, FS.

Law Implemented 403.062, 403.067, FS.

History -- New ________.

62-303.351 Nutrients in Streams.

A stream or stream segment shall be included on the planning list for nutrients if the following biological imbalances are observed:

(1) algal mats are present in sufficient quantities to pose a nuisance or hinder reproduction of a threatened or endangered species, or

(2) annual mean chlorophyll a concentrations are greater than 20 ug/l or if data indicate annual mean chlorophyll a values have increased by more than 50% over historical values for at least two consecutive years. *

Specific Authority 403.061, 403.067, FS.

Law Implemented 403.062, 403.067, FS.

History -- New ________.

62-303.352 Nutrients in Lakes.

For the purposes of evaluating nutrient enrichment in lakes, TSIs shall be calculated based on the procedures outlined on pages 86 and 87 of the State's 1996 305(b) report, which are incorporated by reference. Lakes or lake segments shall be included on the planning list for nutrients if:

(1) For lakes with a mean color greater than 40 platinum cobalt units, the annual mean TSI for the lake exceeds 60, unless paleolimnological information indicates the lake was naturally greater than 60, or

(2) For lakes with a mean color less than or equal to 40 platinum cobalt units, the annual mean TSI for the lake exceeds 40, unless paleolimnological information indicates the lake was naturally greater than 40, or

(3) For any lake, data indicate that annual mean TSIs have increased over the assessment period, as indicated by a positive slope in the means plotted versus time, or the annual mean TSI has increased by more than 10 units over historical values. When evaluating the slope of mean TSIs over time, the Department shall use a Mann's one-sided, upper-tail test for trend, as described in Nonparametric Statistical Methods by M. Hollander and D. Wolfe (1999 ed.), pages 376 and 724 (which are incorporated by reference), with a 95% confidence level.

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Specific Authority 403.061, 403.067, FS.
Law Implemented 403.062, 403.067, FS.
History -- New ________.

62-303.353 Nutrients in Estuaries.

Estuaries or estuary segments shall be included on the planning list for nutrients if their annual mean chlorophyll a for any year is greater than 11 ug/l or if data indicate annual mean chlorophyll a values have increased by more than 50% over historical values for at least two consecutive years.

Specific Authority 403.061, 403.067, FS.
Law Implemented 403.062, 403.067, FS.
History -- New ________.

62-303.360 Primary Contact and Recreation Use Support.

(1) A Class I, II, or III water shall be placed on the planning list for primary contact and recreation use support if:

(a) the water segment does not meet the applicable water quality criteria for bacteriological quality based on the methodology described in section 62-303.320, or

(b) the water segment includes a bathing area that was closed by a local health Department or county government for more than one week or more than once during a calendar year based on bacteriological data, or

(c) the water segment includes a bathing area for which a local health Department or county government has issued closures, advisories, or warnings totaling 21 days or more during a calendar year based on bacteriological data, or

(d) the water segment includes a bathing area that was closed or had advisories or warnings for more than 12 weeks during a calendar year based on previous bacteriological data or on derived relationships between bacteria levels and rainfall or flow.

(2) For data collected after August 1, 2000, the Florida Department of Health (DoH) database shall be the primary source of data used for determining bathing area closures.

(3) Advisories, warnings, and closures based on red tides, rip tides, sewage spills, sharks, medical wastes, hurricanes, or other factors not related to chronic discharges of pollutants shall not be included when assessing recreation use support. However, the Department shall note for the record that data were excluded and explain why they were excluded.

Specific Authority 403.061, 403.067, FS.

Law Implemented 403.062, 403.067, FS.

History -- New __________.

62-303.370 Fish and Shellfish Consumption Use Support.

A Class I, II, or III water shall be placed on the planning list for fish and shellfish consumption if:

(1) the water segment does not meet the applicable Class II water quality criteria for bacteriological quality based on the methodology described in section 62-303.320, or

(2) there is either a limited or no consumption fish consumption advisory, issued by the DoH, or other authorized governmental entity, in effect for the water segment, or

(3) for Class II waters, the water segment includes an area that has been approved for shellfish harvesting by the Shellfish Evaluation and Assessment Program, but which has been downgraded from its initial harvesting classification to a more restrictive classification. Changes in harvesting classification from prohibited to unclassified do not constitute a downgrade in classification.

Specific Authority 403.061, 403.067, FS.

Law Implemented 403.062, 403.067, FS.

History -- New __________.

62-303.380 Drinking Water Use Support and Protection of Human Health.

(1) A Class I water shall be placed on the planning list for drinking water use support if:

(a) the water segment does not meet the applicable Class I water quality criteria based on the methodology described in section 62-303.320, or

(b) a public water system demonstrates to the Department that either:

1. Treatment costs to meet applicable drinking water criteria have increased by at least 25% to treat contaminants that exceed Class I criteria or to treat blue-green algae or other nuisance algae in the source water, or

2. the system has changed to an alternative supply because of additional costs that would be required to treat their surface water source.

(c) When determining increased treatment costs described in paragraph (b), costs due solely to new, *more stringent drinking water requirements, inflation, or increases in costs of* materials shall not be included.

(2) A water shall be placed on the planning list for assessment of the threat to human health if:

(a) for human health-based criteria expressed as maximums, the water segment does not meet the applicable criteria based on the methodology described in section 62-303.320, or

(b) for human health-based criteria expressed as annual averages, the annual average~~mean~~ concentration for any year of the assessment period exceeds the~~a human health-based~~ criteria~~ expressed as an annual average~~. To be used to determine whether a water *should be assessed further for human-health impacts, data must meet the requirements of* paragraphs (2), (3), (6), and (7) in rule 62-303.320.

Specific Authority 403.061, 403.067, FS.
Law Implemented 403.062, 403.067, FS.
History -- New ________.

PART III
THE VERIFIED LIST

62-303.400 Methodology to Develop the Verified List.

(1) *Waters shall be verified as being impaired if they meet the requirements for the* planning list in Part II and the additional requirements of sections 62-303.420-.480. A water body that fails to meet the *minimum criteria for surface waters established in* Rule 62-302.500, F.A.C.; any of its designated uses, as described in this part; or applicable water quality criteria, as described in this part, shall be determined to be impaired.

(2) Additional data and information collected after the development of the planning list will be considered when assessing waters on the planning list, provided it meets the

requirements of this chapter. In cases where additional data are needed for waters on the planning list to meet the data sufficiency requirements for the verified list, it is the Department's goal to collect this additional data as part of its watershed management approach, with the data collected during either the same cycle that the water is initially listed on the planning list (within 1 year) or during the subsequent cycle (six years). Except for data used to evaluate historical trends in chlorophyll a or TSIs, the Department shall not use data that are more than 7.5 years old at the time the water segment is proposed for listing on the verified list.

Specific Authority 403.061, 403.067, FS.

Law Implemented 403.062, 403.067, FS.

History -- New ________.

62-303.410 Determination of Aquatic Life Use Support.

Failure to meet any of the metrics used to determine aquatic life use support listed in sections 62-303.420-.450 shall constitute verification that there is an impairment of the designated use for propagation and maintenance of a healthy, well-balanced population of fish and wildlife.

Specific Authority 403.061, 403.067, FS.

Law Implemented 403.062, 403.067, FS.

History -- New ________.

62-303.420 Exceedances of Aquatic Life-Based Water Quality Criteria.

(1) The Department shall reexamine the data used in rule 62-303.320 to determine exceedances of water quality criteria.

(a) If the exceedances are not due to pollutant discharges and reflect either physical alterations of the water body that cannot be abated or natural background conditions, the water shall not be listed on the verified list. In such cases, the Department shall note for the record why the water was not listed and provide the basis for its determination that the exceedances were not due to pollutant discharges.

(b) If the Department cannot clearly establish that the exceedances are due to natural background or physical alterations of the water body but the Department believes the exceedances are not due to pollutant discharges, it is the Department's intent to determine whether aquatic life use support is impaired through the use of bioassessment procedures referenced in section 62-303.330. The water body or segment shall not be included on the verified list for the parameter of concern if two or more independent bioassessments are conducted and no failures are reported. To be treated as independent bioassessments, they must be conducted at least two months apart.

(2) If the water was listed on the planning list and there were insufficient data from the last five years preceding the planning list assessment to meet the data distribution requirements of section 303.320(4) and to meet a minimum sample size for verification of twenty samples, additional data will be collected as needed to provide a minimum sample size of twenty. Once these additional data are collected, the Department shall re-evaluate the data using the approach outlined in rule 62-303.320(1), but using Table 2, which provides the number of exceedances that indicate a minimum of a 10% exceedance frequency with a minimum of a 90% confidence level using a binomial distribution. The Department shall limit the analysis to data collected during the five years preceding the planning list assessment and the additional data collected pursuant to this paragraph.

Table 2: Verified List

Minimum number of measured exceedances needed to put on the Verified list with at least 90% confidence that the actual exceedance rate is greater than or equal to ten percent.

Sample sizes		Are listed if they have at least this # of exceedances	Sample sizes		Are listed if they have at least this # of exceedances
From	To		From	To	
~~10~~	~~11~~	~~3~~	245	253	32
~~12~~	~~18~~	4	254	262	33
~~19~~20	25	5	263	270	34
26	32	6	271	279	35
33	40	7	280	288	36
41	47	8	289	297	37
48	55	9	298	306	38
56	63	10	307	315	39
64	71	11	316	324	40
72	79	12	325	333	41
80	88	13	334	343	42
89	96	14	344	352	43
97	104	15	353	361	44
105	113	16	362	370	45
114	121	17	371	379	46
122	130	18	380	388	47
131	138	19	389	397	48
139	147	20	398	406	49
148	156	21	407	415	50
157	164	22	416	424	51
165	173	23	425	434	52
174	182	24	435	443	53
183	191	25	444	452	54
192	199	26	453	461	55
200	208	27	462	470	56
209	217	28	471	479	57
218	226	29	480	489	58
227	235	30	490	498	59
236	244	31	499	500	60

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(3) If the water was placed on the planning list based on worst case values used to represent multiple samples taken during a seven day period, the Department shall evaluate whether the worst case value should be excluded from the analysis pursuant to subsections (4) and (5). If the worst case value should not be used, the Department shall then re-evaluate the data following the methodology in rule 62-303.420(2), using the more representative worst case value or, if all valid values are below acutely toxic levels, the median value.

(4) If the water was listed on the planning list based on exceedances of water quality criteria for metals, the metals data shall be validated to determine whether the quality assurance requirements of rule 62-303.320(7) are met and whether the sample was both collected and analyzed using clean techniques, if the use of clean techniques is appropriate. If any data cannot be validated, the Department shall re-evaluate the remaining valid data using the methodology in rule 62-303.420(2), excluding any data that cannot be validated.

(5) Values that exceed possible physical or chemical measurment constraints (pH greater than 14, for example) or that represent data transcription errors, ~~O~~outliers the Department determines are not valid measures of water quality~~identified through statistical procedures~~, water quality criteria exceedances due solely to violations of specific effluent limitations contained in state permits authorizing discharges to surface waters, water quality criteria exceedances within permitted mixing zones for those parameters for which the mixing zones are in effect, and water quality data collected following contaminant spills, discharges due to upsets or bypasses from permitted facilities, or rainfall in excess of the 25-year, 24-hour storm, shall be excluded from the assessment. However, the Department shall note for the record that the data were excluded and explain why they were excluded.

(6) Once the additional data review is completed pursuant to paragraphs (1) through (5), the Department shall re-evaluate the data and shall include waters on the verified list that meet the criteria in rules 62-303.420(2) or 62-303.320(5)(b).

Specific Authority: 403.061, 403.067, FS.

Law Implemented: 403.021(11), 403.062, 403.067, FS.

History -- New __________.

62-303.430 Biological Impairment.

(1) All bioassessments used to list a water on the verified list shall be conducted in accordance with Chapter 62-160, F.A.C., including Department-approved Standard Operating Procedures. To be used for placing waters on the verified list, any bioassessments conducted before the adoption of applicable SOPs for such bioassessments as part of Chapter 62-160 shall substantially comply with the subsequent SOPs.

(2) If the water was listed on the planning list based on bioassessment results, the water shall be determined to be biologically impaired if there were two or more failed bioassessments within the five years preceding the planning list assessment. If there were less than two failed bioassessments during the last five years preceding the planning list assessment, the Department will conduct an additional bioassessment. If the previous failed bioassessment was a BioRecon, then an SCI will be conducted. Failure of this additional bioassessment shall constitute verification that the water is biologically impaired.

(3) If the water was listed on the planning list based on other information specified in rule 62-303.330(4) indicating biological impairment, the Department will conduct a bioassessment in the water segment, conducted in accordance with the methodology in rule 62-303.330, to verify whether the water is impaired. For streams, the bioassessment shall be an SCI. Failure of this bioassessment shall constitute verification that the water is biologically impaired.

(4) Following verification that a water is biologically impaired, a water shall be included on the verified list for biological impairment if:

(a) There are water quality data reasonably demonstrating~~specifying~~ the particular pollutant(s) causing the impairment and the concentration of the pollutant(s); and

(b) One of the following demonstrations is made:

1. if there is a numeric criterion for the specified pollutant(s) in Chapter 62-302, F. A. C., but the criterion is met, an identification of the specific factors that reasonably demonstrate~~as to~~ why the numeric criterion is not adequate to protect water quality and how the specific pollutant is causing the impairment, or

2. if there is not a numeric criterion for the specified pollutant(s) in Chapter 62-302, F.A.C., an identification of the specific factors that reasonably demonstrate how ~~concerning~~ the particular pollutant(s) are associated with ~~shall be identified which connect the specified pollutant to~~ the observed biological effect.

Specific Authority 403.061, 403.067, FS.

Law Implemented 403.062, 403.067, FS.

History -- New ________.

62-303.440 Toxicity.

(1) A water segment shall be verified as impaired due to surface water toxicity in the receiving water body if:

(a) the water segment was listed on the planning list based on acute toxicity data, or

(b) the water segment was listed on the planning list based on chronic toxicity data and the impairment is confirmed with a failed bioassessment that was conducted within six months of a failed chronic toxicity test. For streams, the bioassessment shall be an SCI.

(2) Following verification that a water is impaired due to toxicity, a water shall be included on the verified list if the requirements of paragraph 62-303.430(4) are met.

(3) Toxicity data collected following contaminant spills, discharges due to upsets or bypasses from permitted facilities, or rainfall in excess of the 25-year, 24-hour storm, shall be excluded from the assessment. However, the Department shall note for the record that the data were excluded and explain why they were excluded.

Specific Authority 403.061, 403.067, FS.
Law Implemented 403.062, 403.067, FS.
History -- New ________.

62-303.450 Interpretation of Narrative Nutrient Criteria.

(1) A water shall be placed on the verified list for impairment due to nutrients if there are sufficient data from the last five years preceding the planning list assessment, combined with historical data (if needed to establish historical chlorophyll a levels or historical TSIs), to meet the data sufficiency requirements of rule 62-303.350(2). If there are insufficient data, additional data shall be collected as needed to meet the requirements. Once these additional data are collected, the Department shall re-evaluate the data using the thresholds provided in rule 62-303.351-.353, for streams, lakes, and estuaries, respectively, or alternative, site-specific thresholds that more accurately reflect conditions beyond which an imbalance in flora or fauna occurs in the water segment. In any case, the Department shall limit its analysis to the use of data collected during the five years preceding the planning list assessment and the additional data collected in the second phase. If alternative thresholds are used for the analysis, the Department shall provide the thresholds for the record and document how the alternative threshold better represents conditions beyond which an imbalance in flora or fauna is expected to occur.

(2) If the water was listed on the planning list for nutrient enrichment based on other information indicating an imbalance in flora or fauna, as provided in Rule 62-303.350(1), the Department shall verify the imbalance before placing the water on the verified list for impairment due to nutrients and shall provide documentation supporting the imbalance in flora or fauna.

Specific Authority 403.061, 403.067, FS.
Law Implemented 403.062, 403.067, FS.
History -- New ________.

62-303.460 Primary Contact and Recreation Use Support.

(1) The Department shall review the data used by the DoH as the basis for bathing area closures, advisories or warnings and verify that the values exceeded the applicable DoH thresholds and the data meet the requirements of Chapter 62-160. If the segment is listed on the planning list based on bathing area closures, advisories, or warnings issued by a local health department or county government, closures, advisories, or warnings based on red tides, rip tides, sewer line breaks, sharks, medical wastes, hurricanes, or other factors not related to chronic discharges of pollutants shall not be included when verifying primary contact and recreation use support. The Department shall then re-evaluate the remaining data using the methodology in rule 62-303.360(1)(c). Water segments that meet the criteria in rule 62-303.360(1)(c) shall be included on the verified list.

(2) If the water segment was listed on the planning list due to exceedances of water quality criteria for bacteriological quality, the Department shall, to the extent practical, evaluate the source of bacteriological contamination and shall verify that the impairment is due to chronic discharges of human-induced bacteriological pollutants before listing the water segment on the verified list. The Department shall take into account the proximity of municipal stormwater outfalls, septic tanks, and domestic wastewater facilities when evaluating potential sources of bacteriological pollutants. For water segments that contain municipal stormwater outfalls, the impairment documented for the segment shall be presumed to be due, at least in part, to chronic discharges of bacteriological pollutants. The Department shall then re-evaluate the data using the methodology in rule 62-303.320(1), excluding any values that are elevated solely due to wildlife. Water segments shall be included on the verified list if they meet the requirements in rule 62-303.420(6).

Specific Authority 403.061, 403.067, FS.

Law Implemented 403.062, 403.067, FS.

History -- New ________.

62-303.470 Fish and Shellfish Consumption Use Support.

(1) In order to be used under this part, the Department shall review the data used by the DoH as the basis for fish consumption advisories and determine whether it meets the following requirements:

(a) the advisory is based on the statistical evaluation of fish tissue data from at least twelve fish collected from the specific water segment or water body to be listed,

(b) starting one year from the effective date of this rule, the data are collected in accordance with DEP SOP FS6000 (General Biological Tissue Sampling) and FS 6200 (Finfish Tissue Sampling), which are incorporated by reference, the sampling entity has established

Data Quality Objectives (DQOs) for the sampling, and the data meet the DQOs. Data collected before one year from the effective date of this rule shall substantially comply with the listed SOPs and any subsequently developed DQOs.

(c) there are sufficient data from within the last 7.5~~seven~~ years to support the continuation of the advisory.

(2) If the segment is listed on the planning list based on fish consumption advisories, waters with fish consumption advisories for pollutants that are no longer legally allowed to be used or discharged shall not be placed on the verified list because the TMDL will be zero for the pollutant.

(3) Waters determined to meet the requirements of this section shall be listed on the verified list.

Specific Authority 403.061, 403.067, FS.

Law Implemented 403.062, 403.067, FS.

History -- New ________.

62-303.480 Drinking Water Use Support and Protection of Human Health.

If the water segment was listed on the planning list due to exceedances of a human health-based water quality criterion and there were insufficient data from the last five years preceding the planning list assessment to meet the data sufficiency requirements of section 303.320(4), additional data will be collected as needed to meet the requirements. Once these additional data are collected, the Department shall re-evaluate the data using the methodology in rule 62-303.380(2) and limit the analysis to data collected during the five years preceding the planning list assessment and the additional data collected pursuant to this paragraph (not to include data older than 7.5 years). For this analysis, the Department shall exclude any data meeting the requirements of paragraph 303.420(5). The following~~Any~~ water segments shall be listed on the verified list:

(1) for human health-based criteria expressed as maximums, water segments that meet the requirements in rule 62-303.420(6), or

(2) for human health-based criteria expressed as annual averages, water segments that have an ~~mean~~ annual average that exceeds the applicable criterion ~~shall be listed on the verified list~~.

Specific Authority 403.061, 403.067, FS.

Law Implemented 403.062, 403.067, FS.

History -- New ________.

62-303.500 Prioritization.

(1) When establishing the TMDL development schedule for water segments on the verified list of impaired waters, the Department shall prioritize impaired water segments according to the severity of the impairment and the designated uses of the segment, taking into account the most serious water quality problems; most valuable and threatened resources; and risk to human health and aquatic life. Impaired waters shall be prioritized as high, medium, or low priority.

(2) The following waters shall be designated high priority:

(a) Water segments where the impairment poses a threat to potable water supplies or to human health.

(b) Water segments where the impairment is due to a pollutant regulated by the CWA and the pollutant has contributed to the decline or extirpation of a federally listed threatened or endangered species, as indicated in the Federal Register listing the species.

(3) The following waters shall be designated low priority:

alternative B phased approa

(a) water segments that are listed before 2010 due to fish consumption advisories for mercury (due to the current insufficient understanding of mercury cycling in the environment).

(b) Man-made canals, urban drainage ditches, and other artificial water segments that are listed only due to exceedances of the dissolved oxygen criteria.

(c) Water segments that were not on a planning list of impaired waters, but which were identified as impaired during the second phase of the watershed management approach and were included in the verified list, unless the segment meets the criteria in paragraph (2) for high priority.

(4) All segments not designated high or low priority shall be medium priority and shall be prioritized based on the following factors:

(a) the presence of Outstanding Florida Waters.

(b) the presence of water segments that fail to meet more than one designated use.

(c) the presence of water segments that exceed an applicable water quality criterion or alternative threshold with a greater than twenty-five percent exceedance frequency with a minimum of a 90 percent confidence level.

(d) the presence of water segments that exceed more than one applicable water quality criteria.

(e) administrative needs of the TMDL program, including meeting a TMDL development schedule agreed to with EPA, basin priorities related to following the Department's watershed management approach, and the number of administratively continued permits in the basin.

Specific Authority 403.061, 403.067, FS.
Law Implemented 403.062, 403.067, FS.
History -- New ________.

62-303.600 Evaluation of Pollution Control Mechanisms.

(1) Upon determining that a water body is impaired, the Department shall evaluate whether existing or proposed technology-based effluent limitations and other pollution control programs under local, state, or federal authority are sufficient to result in the attainment of applicable water quality standards.

(2) If, as a result of the factors set forth in (1), the water segment is expected to attain water quality standards in the future and is expected to make reasonable progress towards attainment of water quality standards by the time the next 303(d) list is scheduled to be submitted to EPA, the segment shall not be listed on the verified list. The Department shall document the basis for its decision, noting any proposed pollution control mechanisms and expected improvements in water quality that provide reasonable assurance that the water segment will attain applicable water quality standards.

Specific Authority 403.061, 403.067, FS.
Law Implemented 403.062, 403.067, FS.
History -- New ________.

62-303.700 Listing Cycle.

(1) The Department shall, to the extent practical, develop basin-specific verified lists of impaired waters as part of its watershed management approach, which rotates through the State's surface water basins on a five year cycle. At the end of the first phase of the cycle, which is designed to develop a preliminary assessment of the basin, the Department shall update the planning list for the basin and shall include the planning list in the status report for the basin, which will be noticed to interested parties in the basin. If the specific pollutant causing the impairment in a particular water segment is not known at the time the planning list is prepared, the list shall provide the basis for including the water segment on the planning list. In these cases, the pollutant and concentration causing the impairment shall be identified before the water segment is included on the verified list to be adopted by Secretarial Order. During the second phase of the cycle, which is designed to collect additional data on waters in the basin, interested parties shall be provided the opportunity to work with the Department to collect additional water quality data. Alternatively, interested parties may develop proposed water pollution control mechanisms that may affect the final verified list adopted by the Secretary at the end of the second phase. To ensure that data or information will be considered in the

preliminary basin assessment, it must be submitted to the Department or entered into STORET or, if applicable, the DoH database no later than September 30 during the year of the assessment.

(2) Within a year of the effective date of this rule, the Department shall also prepare a planning list for the entire state.

Specific Authority 403.061, 403.067, FS.

Law Implemented 403.062, 403.067, FS.

History -- New ________.________

62-303.710 Format of Verified List and Verified List Approval.

(1) The Department shall follow the methodology established in this chapter to develop basin-specific verified lists of impaired water segments. The verified list shall specify the pollutant or pollutants causing the impairment and the concentration of the pollutant(s) causing the impairment. If the water segment is listed based on water quality criteria exceedances, then the verified list shall provide the applicable criteria. However, if the listing is based on narrative or biological criteria, or impairment of other designated uses, and the water quality criteria are met, the list shall specify the concentration of the pollutant relative to the water quality criteria and explain why the numerical criterion is not adequate.

(2) For waters with exceedances of the dissolved oxygen criteria, the Department shall identify the pollutants causing or contributing to the exceedances and list both the pollutant and dissolved oxygen on the verified list.

(3) For waters impaired by nutrients, the Department shall identify whether nitrogen or phosphorus, or both, are the limiting nutrients, and specify the limiting nutrient(s) in the verified list.

(4) The verified list shall also include the priority and the schedule for TMDL development established for the water segment, as required by federal regulations.

(5) The verified list shall also note any waters that are being removed from the current planning list and any previous verified list for the basin.

(6) The verified basin-specific 303(d) list shall be approved by order of the Secretary.

Specific Authority 403.061, 403.067, FS.

Law Implemented 403.062, 403.067, FS.

History -- New ________.________

PART IV

MISCELLANEOUS PROVISIONS

62-303.720 Delisting Procedure.

(1) Waters on planning lists developed under this Chapter that are verified to not be impaired during development of the verified list shall be removed from the State's planning list. Once a water segment is verified to not be impaired pursuant to Part III of this chapter, the data used to place the water on the planning list shall not be the sole basis for listing that water segment on future planning lists.

(2) Water segments shall be removed from the State's verified list only after completion of a TMDL for all pollutants causing impairment of the segment or upon demonstration that the water meets the water quality standard that was previously established as not being met.

(a) For waters listed due to failure to meet aquatic life use support based on water quality criteria exceedances or due to threats to human health based on exceedances of single sample water quality criteria, the water shall be delisted when: *

1. the number of exceedances of an applicable water quality criterion due to pollutant discharges is less than or equal to the number listed in Table 3 for the given sample size, with a minimum sample size of 30. This table provides the number of exceedances that indicate a maximum of a 10% exceedance frequency with a minimum of a 90% confidence level using a binomial distribution, or

2. following implementation of pollution control activities that are expected to be sufficient to result in attainment of applicable water quality standards, evaluation of new data indicates the water no longer meets the criteria for listing established in section 62-303.420., or

3. following demonstration that the water was inappropriately listed due to flaws in the original analysis, evaluation of available data indicates the water does not meet the criteria for listing established in section 62-303.420.

New data evaluated under rule 62-303.720(2)(a)1. must meet the following requirements:

a. they must include samples collected during similar conditions (same seasons and general flow conditions) that the data previously used to determine impairment were collected, with no more than 50% of the samples collected in any one quarter,

b. the sample size must be a minimum of 30 samples, and

c. the data must meet the requirements of paragraphs 62-303.320(4), (6) and (7).

(b) For waters listed due to failure to meet aquatic life use support based on biological data, the water shall be delisted when the segment passes two independent follow-up bioassessments and there have been no failed bioassessments for at least one year. The follow-up tests must meet the following requirements:

1. For streams, the new data may be two BioRecons or any combination of BioRecons and SCIs.

2. The bioassessments must be conducted during similar conditions (same seasons and general flow conditions) under which the previous bioassessments used to determine impairment were collected.

3. The data must meet the requirements of Section 62-303.330(1) and (2), F.A.C.

(c) For waters listed due to failure to meet aquatic life use support based on toxicity data, the water shall be delisted when the segment passes two independent follow-up toxicity tests and there have been no failed toxicity tests for at least one year. The follow-up tests must meet the following requirements:

1. The tests must be conducted using the same test protocols and during similar conditions (same seasons and general flow conditions) under which the previous test used to determine impairment were collected.

2. The data must meet the requirements of rules 62-303.340(1), and the time requirements of rules 62-303.340(2) or (3).

(d) For waters listed due to fish consumption advisories, the water shall be delisted following the lifting of the advisory or when data complying with rule 62-303.470(1)(a) and (b) demonstrate that the continuation of the advisory is no longer appropriate.

(e) For waters listed due to changes in shellfish bed management classification, the water shall be delisted upon reclassification of the shellfish harvesting area to its original or higher harvesting classification. Reclassification of a water from prohibited to unclassified does not constitute a higher classification.

(f) For waters listed due to bathing area closure or advisory data, the water shall be delisted if the bathing area does not meet the listing thresholds in rule 62-303.360(1) for five consecutive years

(g) For waters listed based on impacts to potable water supplies, the water shall be delisted when applicable water quality criteria are met as defined in rule 62-303.380(1)(a) and when the causes resulting in higher treatment costs have been ameliorated.

(h) For waters listed based on exceedance of a human health-based annual average criterion, the water shall be delisted when the annual average concentration is less than the criterion for three consecutive years.

(i) For waters listed based on nutrient impairment, the water shall be delisted if it does not meet the listing thresholds in rule 62-303.450 for three consecutive years.

(j) For any listed water, the water shall be delisted if, following a change in approved analytical procedures, criteria, or water quality standards, evaluation of available data indicates the water no longer meets the applicable criteria for listing.

Table 3: Delisting

Maximum number of measured exceedances allowable to DELIST with at least 90% confidence that the actual exceedance rate is less than ten percent.

Sample sizes		Maximum # of exceedances allowable for delisting
From	To	
30	37	0
38	51	1
52	64	2
65	77	3
78	90	4
91	103	5
104	115	6
116	127	7
128	139	8
140	151	9
152	163	10
164	174	11
175	186	12
187	198	13
199	209	14
210	221	15
222	232	16
233	244	17
245	255	18
256	266	19
267	278	20
279	289	21

Sample sizes		Maximum # of exceedances allowable for delisting
From	To	
290	300	22
301	311	23
312	323	24
324	334	25
335	345	26
346	356	27
357	367	28
368	378	29
379	389	30
390	401	31
402	412	32
413	423	33
424	434	34
435	445	35
446	456	36
457	467	37
468	478	38
479	489	39
490	500	40

(3) Any delisting of waters from the verified list shall be approved by order of the Secretary at such time as the requirements of this section are met.

Specific Authority 403.061, 403.067, FS.

Law Implemented 403.062, 403.067, FS.

History -- New ________.

62-303.810 Impairment of Interstate and Tribal Waters.

The Department shall work with Alabama, Georgia, and federally recognized Indian Tribes in Florida to share information about their assessment methodology and share water quality data for waters that form state boundaries or flow into Florida. In cases where assessments are different for the same water body, the Department shall, to the extent practical, work with the appropriate state, Indian Tribe and EPA to determine why the assessments were different.

Specific Authority 403.061, 403.067 FS.

Law Implemented 403.062, 403.067 FS.

History – New _______.

Winston H. Hickox
Secretary for Environmental Protection

State Water Resources Control Board

Division of Water Quality
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Gray Davis
Governor

The energy challenge facing California is real. Every Californian needs to take immediate action to reduce energy consumption. For a list of simple ways you can reduce demand and cut your energy costs, see our website at http://www.swrcb.ca.gov.

TO: All Regional Board 303(d) Listing Staff

Nancy Richard

FROM: Nancy Richard
DIVISION OF WATER QUALITY

DATE: JUN 27 2001

RE: REQUESTED 303(d) ASSESSMENT DOCUMENTS

I am sending this package of documents at the request of Regional Board staff. These documents pertain to making water quality assessments and determining impaired waters for listing. The documents are:

Weight of Evidence and 303(d) Listing Discussion Paper – Considerations are presented for cases of less compelling evidence of indications of impairment (i.e., the use of supporting information).

1998 USEPA Guidelines for Preparation of the Comprehensive State Water Quality Assessments (305(b) Reports) and Electronic Updates – Guidelines for Making Use Support Determinations are in Section 3

Central Valley Regional Board Memorandum: 2002 Clean Water Act (CWA) Section 303(d): Preparation of Recommendations to the State Water Resources Control Board from the Central Valley Regional Water Quality Control Board- FYI example of how one Regional Board is making its listing decisions and examples of factsheets

USEPA Draft Consolidated Assessment and Listing Methodology (CALM)– USEPA's draft guidance for listing decisions.

Please note that this package is not to be construed as guidance for 303(d) listing decisions. We are not promoting or opposing, at this time, the use of any of these documents in making your 303(d) listing decisions. If you have any questions, you can call me at (916)-341-5546.

Weight of Evidence and 303 Listing.

In developing the 303 list we are mandated to evaluate all existing and readily available information. This carries with it the implication that readily available information is sufficient for determining if a water is impaired. This implication is not a directive, we could define a very rigorous threshold for determining impairment. However, it seems logical that the law would contemplate relying on the consideration of available information rather than a wholesale rejection of available information because it doesn't conform to a rigorous decision threshold. In other words, it is not necessary to have a comprehensive study with detailed statistical analysis of the magnitude, duration, and intensity of impact to beneficial uses to conclude that an impairment exists. In fact, a listing implies only that sufficient information exists to consider at least one point in the water body to have exceeded standards for at least one significant period of time. It does not mean the entire water body does not attain standards for all times.

In considering how to look at available information it is readily clear that no standardized set of information can be used as a determinant for listing. Any available information is to be considered. Therefore some means of bringing any type of information into the evaluation must be established. The typical description for this approach is a weight-of-evidence approach. In this method the evaluator weighs various pieces of information as to its ability to demonstrate a credible line of reasoning leading to a conclusion about the condition of the water. Three possible conclusion exist: 1) the water is not meeting standards, 2) it is meeting standards, or 3) we just can't tell.

When assembling information it is often useful to first consider single lines of evidence. Is there a single type of information that sufficiently characterizes the waters conditions. In the case of numeric standards we look to water column data to see if we can determine a clear signal. Numeric criteria consist of three parts: a chemical concentration, and an averaging period, and an exceedance frequency. Typically our standards are stated as instantaneous maxima, short hourly averages, 4 day averages, 30 day averages, monthly averages, or median values for a given period of time. A typical data set for a water attaining standards will contain many values near or below the standard and relatively few values marking the extreme condition. If the extreme condition is a high flow event or above the usual value (the most common case) the extremes will act to pull the average up. If the extreme is below the usual value the extreme will pull the average down. If one compares the median to the mean in the common case this implies the mean falls above the median. We can use this relationship in evaluating chemical data and information and as a basis for building the weight of evidence.

Take for example the aquatic life protection criteria based on EPA methods. These values are 4 day averages not to be exceeded more than once every three years. We do not collect data that can be used to directly assess the 4 day average. Our sampling is typically grab samples. A single grab sample cannot be used to evaluate the 4 day average. There is no way to determine the variability associated with the average or the sample from a single sample. However, the sample remains the best estimate of the 4 day average that we have. If we have a number of samples over a period of time we can evaluate the trend of the estimates. Over time we would expect the mean of 4 day averages to approach the standard. That is to say the variability about a single mean estimate becomes insignificant and a determination of compliance with the standard can be reached. If the only consideration is the absolute value of the mean, then a large number of samples will be required. If we look to the relationship of the median to the mean a smaller number of samples may suffice. If we would expect the common circumstance of the mean above the median, but find instead that the mean falls below the median we can assume the water is not behaving normally. If the mean of the samples also falls above the standard then we may assume we have a noncompliance situation. If we expect the common circumstance and find the mean above the median, then we would need to see a significant departure from the standard before we would be comfortable claiming impairment. This is because a small sample could easily be impacted by the variability inherent in the grab sample estimate. Since we have no way of evaluating this variability we should be cautious in claiming impairment where we see an expected pattern or condition.

For longer averaging periods or those few cases where we have at least 3 samples within the averaging period we can make a direct estimate of variability and a more direct statistical analysis of conformity with the standard.

In most cases 3 samples will not provide much assurance of the accuracy of the determination. In these cases we look to supporting information. We depart from the single line of evidence and begin building an assessment based on indications from different types of data. There is not a prescribed approach to constructing the weight of evidence. But some simple rules of thumb may help. We typically look first at the most direct measure of the subject of the standard in question. If this is a chemical concentration standard we look to chemistry information. If it is a narrative regarding aquatic community structure we look to bioassessment data. These data will provide an initial indication. We then look for other evidence that supports the indication. Are there land uses that have been associated with a problem indicated by the initial evaluation? Is there toxicity data to correspond to the chemical data. Are there official warnings or declarations of regulatory agencies that support the indication. Typically, unless we have a strongly compelling single line of evidence we will look to these multiple lines of information to bolster the decision. These lines of evidence can work to either support a listing or confirm that no listing is appropriate. Information such as photo monitoring is typically used as this type of ancillary information. In some cases quantitative photo monitoring techniques are used, and these can be treated as a single line of evidence. Model results are typically looked at in light of a weight of evidence. That is reliance on a model result alone is not usually used. Similarly, land use analysis typically requires additional information beyond simply the presence of a land use type that we have found to frequently be associated with water quality problems.

In many cases a clear conclusion will not be reached, either the information is not sufficient or it is contradictory and therefore no clear description of impairment is possible. For these waters we need to record this fact and identify these waters as a group. If the group is small when we are done listing we can pursue further assessment as resources allow. If a significant portion of the waters reviewed fall into this category then we must devise a programmatic response to addressing this information gap.

The rigor of the evidence used to list becomes a judgment decision of the Regional Boards and their staff. It must be kept in mind that a decision to list does not require the same certainty that is applied when determining violations of permit conditions. Constructing the list is not a regulatory action. It is an informational and administrative exercise that prioritizes our work and highlights problem locations. As such the judgment of staff is sufficient basis for listing. What is necessary is a reasonable rationale to the support the listing, and documentation of the information relied on to reach that conclusion. The regulatory actions associated with listing come as a response to the list. TMDLs, standards actions, or other means of resolving the non attainment condition are the regulatory instruments.

United States
Environmental Protection
Agency

Office of Water (4503F)
Washington, DC 20460

EPA-841-B-97-002B
September 1997

EPA

Guidelines for Preparation of the Comprehensive State Water Quality Assessments (305(b) Reports) and Electronic Updates:

Supplement

Recycled/Recyclable • Printed with Vegetable-Based Inks on Recycled Paper (20% Postconsumer)

SECTION 1

WATER QUALITY ASSESSMENTS UNDER SECTION 305(b)

This section describes the basic components of a water quality assessment including degree of use support, causes (pollutants and other stressors), and sources of impairment. It also explains several concepts that may have resulted in inconsistencies in the past, such as the fully supporting but threatened category, presumed assessments, and natural sources.

1.1 What is an Assessment?

In setting their water quality standards, States assign one or more designated uses to each individual waterbody. Designated uses are beneficial uses that States want their waters to support. Examples are aquatic life support, fish consumption, swimming, and drinking water supply. Under Section 305(b), assessment of an individual waterbody (e.g., a stream segment or lake) means analyzing biological, habitat, physical/chemical, and/or toxicity data and other information to determine

- The degree of designated use support of the waterbody (fully supporting, fully supporting but threatened, partially supporting, or not supporting)
- If designated uses are impaired, the causes (pollutants or other stressors) and sources of the problem
- Degree of achievement of biological integrity using State biological criteria or other measures.
- Descriptive information such as the type and quality of data used in the assessment.

Figure 1-1 illustrates how monitoring, assessment, and reporting are related for an individual waterbody. Figure 1-2 shows actual assessment results for a waterbody.

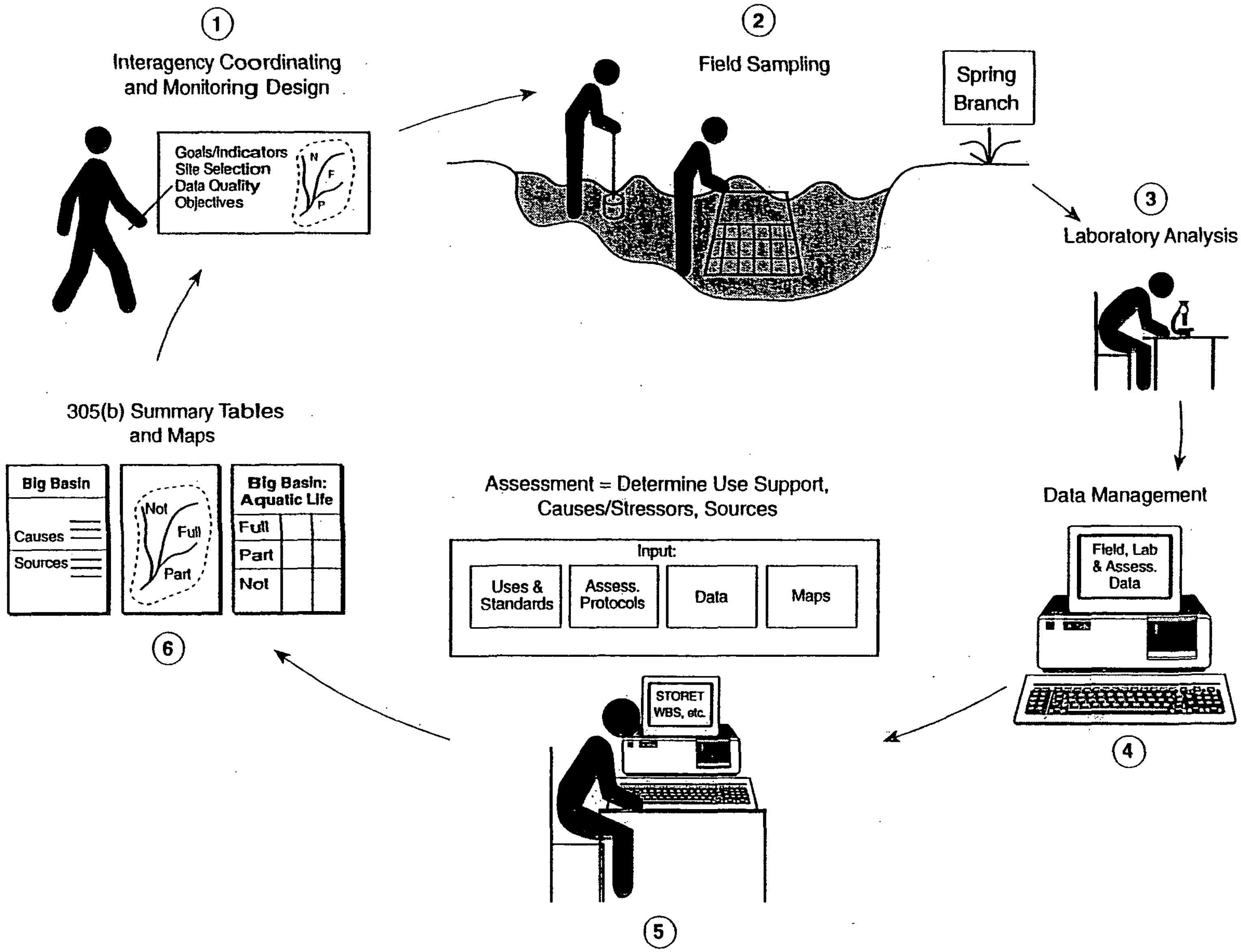


Figure 1-1. Monitoring, assessment and 305(b) reporting as an interrelated process

```
                    General Report of All Waterbody Data
                  (Partial Listing for a Single Waterbody)

                                 08-11-95

Waterbody ID   : VT08-01                        Segment Number: 00
Waterbody Name: Lower Winooski River

Waterbody Type: River                          Size:      20.00 Miles
---------------------------- Waterbody Location ----------------------------
Basin: 08-Winooski
CU: Not Available
Stream Order: Not Available
Monitoring Stations: Not Available
Boundary States: Not Available

Counties:  FIPS Number    County Name

Ecoregion number: Not entered
Ecoregion name   : Not entered

Description of the Waterbody:
Main Stem - Mouth to Confluence of Alder Brook
------------------------------- Reach Indexing -----------------------------
Next Assessment: Not Available
==================== Waterbody Assessment - Date: 9401 ====================

Begin Sampling: Not Available          End Sampling: Not Available

-------------------------AQUATIC LIFE SUPPORT------------------------------

Fully Supported      =>     0.00     Threatened      =>     2.50
Partially Supported =>     17.50     Not Supported   =>     0.00
Not Attainable       =>     0.00     Not Assessed    =>     0.00

----------------------- SWIMMABLE -----------------------------------------

Fully Supported      =>     2.50     Threatened      =>     0.00
Partially Supported =>     17.50     Not Supported   =>     0.00
Not Attainable       =>     0.00     Not Assessed    =>     0.00

------------------------ Media/Pollutants Assessed ------------------------

Toxics Monitoring => Y

10-Metals in sediments
--------------------------- Nonattainment Causes -------------------------

     Cause                                  Size Mag

0300-Priority organics                     17.50  S
0400-Nonpriority organics                   2.50  T
0500-Metals                                17.50  S
0900-Nutrients                             17.50  M
1100-Siltation                             17.50  M
1200-Organic enrichment/Low DO             17.50  S
1500-Flow alteration                       17.50  M
1700-Pathogens                             17.50  M
1900-Oil and grease                        17.50  M
2000-Taste and odor                        17.50  M

-------------------------- Nonattainment Sources -------------------------
     Source                                                      Size Mag
0100-INDUSTRIAL POINT SOURCES                                   17.50 M
0200-MUNICIPAL POINT SOURCES                                    17.50 M
1000-AGRICULTURE                                                17.50 S
3200-Land Development                                           17.50 H
4000-URBAN RUNOFF/STORM SEWERS                                  17.50 H
6300-Landfills                                                  17.50 S
6600-Hazardous Waste                                             2.50 T
7400-Flow Regulation/Modification                               17.50 M
8300-Highway Maintenance And Runoff                             17.50 M
8400-Spills                                                     17.50 S
8800-Upstream Impoundment                                       17.50 M
```

Figure 1-2. Waterbody System printout summarizing assessment results for a waterbody

1.2 Degree of Use Support

Each designated use has its own requirements for a finding of fully supporting, fully supporting but threatened, partially supporting, or not supporting. **Section 3 of this *Guidelines Supplement* gives EPA's detailed recommendations for determining the degree of use support for various designated uses.**

Throughout these *Guidelines*, the term "impairment" means either partially supporting or not supporting a designated use.

The category "fully supporting but threatened" requires further explanation. A waterbody is fully supporting but threatened for a particular designated use when it fully supports that use now but may not in the future unless pollution prevention or control action is taken because of anticipated sources or adverse pollution trends. Such waters are treated as a separate category from waters fully supporting uses. States should use this category to describe waters for which actual monitoring or evaluative data indicate an apparent declining water quality trend (i.e., water quality conditions have deteriorated, compared to earlier assessments, but the waters still support uses). States may also choose to include waters for which monitoring or evaluative data indicate potential water quality problems requiring additional data or verification.

Fully supporting but threatened is not appropriate during temporary impairment of designated uses (e.g., due to a construction project in a watershed). The threatened category may be appropriate prior to anticipated impairment, but while actual impairment is occurring, partial support or nonsupport should be reported.

Summarizing Assessment Results in the Report to Congress

EPA uses the following descriptive terms in graphical presentations of degree of designated use support:

Good Water Quality	=	Fully Supporting or Fully Supporting but Threatened
Fair Water Quality	=	Partially Supporting
Poor Water Quality	=	Not Supporting

Note: Impaired means Partially Supporting or Not Supporting (Fair or Poor)

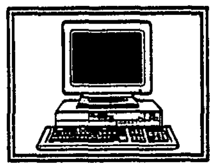
1.3 Types of Assessment Information

Each State reports assessments of those waterbodies for which use support decisions can be based on reliable water quality information. Such assessments are not limited to waters that have been directly monitored -- it is appropriate in many cases to make judgments based on other information (see Section 1.4). Waterbodies assessed prior to the current reporting period can be included in 305(b) reports if the State has the technical basis to conclude that the assessment results are still valid. **It is not appropriate, however, to claim that waterbodies are fully supporting uses by default in the absence of sufficient information to make an assessment (see also Section 1.5).**

If statistical survey (probability) designs are used, the results can be reported relative to the entire resource (e.g., headwater streams in an ecoregion), not just those waterbodies actually monitored.

Table 1-1 lists categories of information for assessments. These Assessment Type Codes are from the EPA Waterbody System (WBS). They provide a wealth of information about the basis for individual assessments.

Assessment Database Managers—For 1997 and beyond, EPA is strongly encouraging the use of Assessment Type Codes in WBS and other State assessment data systems. They are important data elements for annual electronic updates (see Section 6 of the main *Guidelines* volume).



1.4 Monitored and Evaluated Waters

EPA asks the States to distinguish between assessments based on monitoring and assessments based on other information.

- "Evaluated waters" are those waterbodies for which the use support decision is based on information other than current site-specific ambient data, such as data on land use, location of sources, predictive modeling using estimated input variables, and some questionnaire surveys of fish and game biologists. *As a general guide*, if an assessment is based on older ambient data (e.g., older than five years), the State should also consider it "evaluated."

Table 1-1. Assessment Type Codes from the Waterbody System

100	**Qualitative (evaluated) assessment--unspecified[a]**
110	Information from local residents
120	Surveys of fish and game biologists/other professionals
130	Land use information and location of sources
140	Incidence of spills, fish kills, or abnormalities
150	Monitoring data that are more than 5 years old
175	Occurrence of conditions judged to cause impairment (e.g., channelization, dredging, severe bank erosion)
180	Screening models (desktop models; models are not calibrated or verified)
190	Biological/habitat data extrapolated from upstream or downstream waterbody
191	Physical/chemical data extrapolated from upstream or downstream waterbody
200	**Physical/chemical monitoring[b]**
210	Fixed-station physical/chemical monitoring, conventional pollutants only
211	Highest quality fixed-station physical/chemical monitoring, conventional pollutants; frequency and coverage sufficient to capture acute and chronic events, key periods, high and low flows
220	Non-fixed-station physical/chemical monitoring, conventional pollutants only
222	Non-fixed-station monitoring, conventional, during key seasons and flows
230	Fixed-station physical/chemical monitoring, conventional plus toxic pollutants
231	Highest quality fixed-station physical/chemical monitoring, conventional plus toxicants; frequency and coverage sufficient to capture acute and chronic events, key periods, high and low flows
240	Non-fixed-station physical/chemical monitoring, conventional plus toxic pollutants
242	Non-fixed-station physical/chemical monitoring, conventional plus toxicants, during key seasons and flows
250	Chemical monitoring of sediments
260	Fish tissue analysis
270	Community water supply chemical monitoring (ambient water)
275	Community water supply chemical monitoring (finished water)
300	**Biological monitoring[b]**
310	Ecological/habitat surveys
315	Regional reference site approach
320	Benthic macroinvertebrate surveys
321	RBP III or equivalent benthos surveys
322	RBP I or II or equivalent benthos surveys
330	Fish surveys
331	RBP V or equivalent fish surveys
340	Primary producer surveys (phytoplankton, periphyton, and/or macrophyton)
350	Fixed-station biological monitoring

Table 1-1 (continued)

360	**Habitat assessment**
365	Visual observation, usually at road crossings; professional not required
370	Visual observation, use of land use maps, reference conditions, professional not required
375	Visual observation, may quantify some parameters; single season typically; by professional
380	Quantitative measurements of instream parameters, channel morphology, floodplain; one or two seasons; by professional
400	**Pathogen monitoring**[b]
410	Shellfish surveys
420	Water column surveys (e.g., fecal coliform)
430	Sediment analysis
440	Community water supply pathogen monitoring (ambient water)
450	Community water supply pathogen monitoring (finished water)
500	**Toxicity testing**[b]
510	Effluent toxicity testing, acute
520	Effluent toxicity testing, chronic
530	Ambient toxicity testing, acute
540	Ambient toxicity testing, chronic
550	Toxicity testing of sediments
600	**Modeling**[c]
610	Calibrated models (calibration data are less than five years old)
700	**Integrated intensive survey**[b] (field work exceeds one 24-hour period and multiple media are sampled)
710	Combined sampling of water column, sediment, and biota for chemical analysis
720	Biosurveys of multiple taxonomic groups (e.g., fish, invertebrates, algae)
Assessments Based on Data from Other Sources	
800	**Assessments based on data from other sources**[c]
810	Chemical/physical monitoring data by quality-assured volunteer program
820	Benthic macroinvertebrate surveys by quality-assured volunteer program
830	Bacteriological water column sampling by quality-assured volunteer program
840	Discharger self-monitoring data (effluent)
850	Discharger self-monitoring data (ambient)
860	Monitoring data collected by other agencies or organizations (use the assessment comment field to list other agencies)
870	Drinking water supply closures or advisories (source-water quality based)

Table 1-1 (continued)

Discrepancy in Aquatic Life Assessment Results[d]

900 Discrepancy in Aquatic Life Assessment Results

910 Discrepancy among different data types; aquatic life assessment is based on physical/chemical data

920 Discrepancy among different data types; aquatic life assessment is based on biological data

925 Discrepancy among different data types; aquatic life assessment is based on habitat data

930 Discrepancy among different data types; aquatic life assessment is based on toxicity testing data

940 Discrepancy among different data types; aquatic life assessment is based on qualitative (evaluated) assessment data

[Note: New codes have been added to include information types in Tables 3-2 and 3-3.]

[a] Generally considered to be evaluated assessment types.

[b] Generally considered to be monitored assessment types.

[c] Considered to be monitored or evaluated assessment types depending on data quality and State assessment protocols.

[d] States are requested to use these codes to identify cases when biological, habitat, toxicity, and/or physical/chemical data show different assessment results.

- "Monitored waters" are those waterbodies for which the use support decision is principally based on current, site-specific, ambient monitoring data believed to accurately portray water quality conditions. Waters with data from biosurveys should be included in this category along with waters monitored by fixed-station chemical/physical monitoring or toxicity testing. To be considered "monitored" based on fixed-station chemical/physical monitoring, waters generally should be sampled quarterly or more frequently. For specifics on biological monitoring, see Section 3.

States may use some flexibility in applying these guidelines. For example:

- For the 800 series of codes in Table 1-1, if State-approved quality assurance/quality control procedures have been applied to volunteer monitoring programs, waters sampled under these programs could be considered monitored. However, a State may use its discretion in making an Assessment Category determination of evaluated vs. monitored. The State may wish to conduct a comparison to determine the sensitivity or power of the volunteer method compared to the State's methods (e.g., volunteer data may prove more useful for identifying severe impacts than for determining full support). Note: EPA has developed *The Volunteer Monitor's Guide to Quality Assurance Project Plans*. To obtain a copy, contact the Monitoring Branch at (202) 260-7018.

- If older ambient data exist for high-quality waters located in remote areas with no known pollutant sources, and if those data are believed to accurately portray water quality conditions, those waters could be considered monitored.

EPA and States have been working together to better define the kinds of data upon which assessment decisions are made. See Tables 3-1 through 3-4.

1.5 Presumed Assessments

The 305(b) Consistency Workgroup determined that presumed assessments are unacceptable. Examples of presumed assessments are

- Assuming that waterbodies are fully supporting by default unless there is information to the contrary

- Extrapolating assessments from one waterbody or watershed to others unless they have very similar characteristics

- Extrapolating the "percentage of assessed stream miles that are fully supporting" to all streams in the State without adequate scientific basis such as probability-based monitoring design.

Note: If waterbodies are monitored using survey designs, results can be extrapolated.

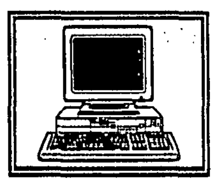
EPA encourages States to report on all waters for which there is a reasonable technical basis for evaluation. A reasonable basis could include a judgment that a stream is not supporting uses based on channelization, a highly disturbed watershed, or data from nearby streams with similar characteristics.

In addition, EPA recommends that data from a single monitoring station not be used to generate a monitored assessment of an entire watershed. Rather, a monitoring station can be considered representative of a waterbody for that distance upstream and/or downstream in which there are no significant influences to the waterbody that might tend to change water quality within the zone represented by the monitoring station. See Section 2.1.

1.6 Causes of Impairment (Pollutants and Other Stressors)

Causes of impairment are those pollutants and other stressors that contribute to the impairment of designated uses in a waterbody. In the remainder of these *Guidelines* the term "cause/stressor" is used. Table 1-2 lists cause/stressor codes from the WBS. States can also add their own codes to WBS to track additional causes. At the States' request, EPA has added new subcategories under Code 0500 and Code 0900 to track specific metals and nutrients.

How to Avoid Double-counting of Causes/Stressors



WBS Users—If you use the new subcategories for metals/nutrients or add cause/stressor codes to WBS, *you must enter a total size for each major category of causes/stressors (the **bold categories** in Table 1-2; e.g., **0500--Metals or 0200--Pesticides**) for each waterbody.* This is necessary because there may be overlap among the subcategories of causes/stressors.

Non-WBS Users—Like WBS, most customized waterbody-level databases must also track a total size for each major category of causes/stressors (the **bold categories** in Table 1-2) in order to avoid overlap among subcategories.

Table 1-2. Cause/Stressor Codes from the Waterbody System

0000	**Cause Unknown**	**1000**	**pH**
0100	**Unknown Toxicity**	**1100**	**Siltation**
0200	**Pesticides**	**1200**	**Organic Enrichment\Low Dissolved Oxygen**
0300	**Priority Organics**		
0400	**Nonpriority Organics**		
0410	**PCBs**	**1300**	**Salinity/Total Dissolved Solids/Chlorides/Sulfates**
0420	**Dioxins**		
0500	**Metals**	**1400**	**Thermal Modifications**
	0510 Arsenic	**1500**	**Flow Alterations**
	0520 Cadmium	**1600**	**Habitat Alterations (other than flow)**
	0530 Copper		
	0540 Chromium	**1700**	**Pathogens**
	0550 Lead	**1800**	**Radiation**
	0560 Mercury	**1900**	**Oil and Grease**
	0570 Selenium	**2000**	**Taste and Odor**
	0580 Zinc	**2100**	**Suspended Solids**
0600	**Ammonia (un-ionized)**	**2200**	**Noxious Aquatic Plants (native macrophytes)[a]**
0700	**Chlorine**		
0720	**Cyanide**	**2210**	**Excessive Algal Growth/ Chlorophyll a**
0750	**Sulfates**		
0800	**Other Inorganics**	**2400**	**Total Toxics**
0900	**Nutrients**	**2500**	**Turbidity**
	0910 Phosphorus	**2600**	**Exotic Species**
	0920 Nitrogen		
	0990 Other		

NOTES: In addition to the above, WBS users can enter their own customized cause codes. See WBS Users Guide.

Codes 0200 through 0800 are toxicants for purposes of WBS reports.

Filling and draining is considered a source (Source Code 7800) and no longer appears in the above table.

Bold type indicates a major cause category; regular type indicates a subcategory.

[a]Non-native plants should be handled under Category 2600.

In Table 1-2, bold type indicates a major cause/stressor category and regular type indicates a subcategory. **See the highlight box entitled "How to Avoid Double-counting of Causes/Stressors" regarding the importance of storing size data for major cause/stressor categories, not just subcategories.**

1.7 Sources of Impairment

Sources are the activities, facilities, or conditions that contribute pollutants or stressors resulting in impairment of designated uses in a waterbody. Table 1-3 lists source codes from the WBS. States can also add their own source codes to the WBS. Appendix G provides definitions of selected source categories.

In Table 1-3, bold type indicates a major source category and regular type indicates a subcategory of that major category. **See the highlight box entitled "How to Avoid Double-counting of Sources" regarding the importance of storing size data for all applicable major source categories, not just subcategories.**

Determining the sources of designated use impairment can be a difficult process. Ambient monitoring data can give good evidence of the causes of impairment. In some cases, field observations can provide information on obvious, nearby problems; e.g., land use, substrate, and habitat may provide a basis for identifying sources. This is especially the case for "hydromodification" sources.

In most cases, additional information is needed--watershed land use inventories, records of permit compliance, locations of areas with highly erodible soils, areas with poor best management practice (BMP) implementation, measurements of in-place contaminants, or loadings from atmospheric transport or ground water.

Assessment Database Managers—Agriculture is the only source category with three tiers of codes (see Table 1-3). EPA asks States to track size data for the "1000—Agriculture" code and at least the next tier ("1050—Crop-related Sources", etc.)

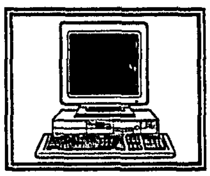


Table 1-3. Source Categories (with National Codes from the Waterbody System)

0100 Industrial Point Sources
- 0110 Major Industrial Point Sources
- 0120 Minor Industrial Point Sources

0200 Municipal Point Sources
- 0210 Major Municipal Point Sources—dry and/or wet weather discharges
- 0212 Major Municipal Point Sources—dry weather discharges*
- 0214 Major Municipal Point Sources—wet weather discharges*
- 0220 Minor Municipal Point Sources—dry and/or wet weather discharges
- 0222 Minor Municipal Point Sources—dry weather discharges*
- 0224 Minor Municipal Point Sources—wet weather discharges*
- 0230 Package Plants (Small Flows)

0400 Combined Sewer Overflow
0500 Collection System Failure*
0900 Domestic Wastewater Lagoon

1000 Agriculture**
- **1050 Crop-related Sources***
  - 1100 Nonirrigated Crop Production
  - 1200 Irrigated Crop Production
  - 1300 Specialty Crop Production (e.g., horticulture, citrus, nuts, fruits)
- **1350 Grazing-related Sources***
  - 1400 Pasture grazing—Riparian and/or Upland
  - 1410 Pasture Grazing--Riparian*
  - 1420 Pasture Grazing--Upland*
  - 1500 Range Grazing—Riparian and/or Upland
  - 1510 Range Grazing--Riparian*
  - 1520 Range Grazing--Upland*
- **1600 Intensive Animal Feeding Operations***
  - 1620 Concentrated Animal Feeding Operations (CAFOs; permitted, PS)
  - 1640 Confined Animal Feeding Operations (NPS)
  - 1700 Aquaculture

2000 Silviculture
- 2100 Harvesting, Restoration, Residue Management
- 2200 Forest Management (e.g., pumped drainage, fertilization, pesticide application)
- 2300 Logging Road Construction/Maintenance
- 2400 Silvicultural Point Sources

Table 1-3 (continued)

3000	**Construction**	
	3100	Highway/Road/Bridge Construction
	3200	Land Development
4000	**Urban Runoff/Storm Sewers**	
	4100	Nonindustrial Permitted
	4200	Industrial Permitted
	4300	Other Urban Runoff
	4400	Illicit connections/illegal hook-ups/dry weather flows*
	4500	Highway/Road/Bridge Runoff*
	4600	Erosion and Sedimentation*
5000	**Resource Extraction**	
	5100	Surface Mining
	5200	Subsurface Mining
	5300	Placer Mining
	5400	Dredge Mining
	5500	Petroleum Activities
	5600	Mill Tailings
	5700	Mine Tailings
	5800	Acid Mine Drainage
	5900	Abandoned mining*
	5950	Inactive mining*
6000	**Land Disposal**	
	6100	Sludge
	6200	Wastewater
	6300	Landfills
	6350	Inappropriate Waste Disposal/Wildcat Dumping*
	6400	Industrial Land Treatment
	6500	Onsite Wastewater Systems (Septic Tanks)
	6600	Hazardous Waste
	6700	Septage Disposal
7000	**Hydromodification**	
	7100	Channelization
	7200	Dredging
	7300	Dam Construction
	7350	Upstream Impoundment
	7400	Flow Regulations/Modification

Table 1-3 (continued)

7550 Habitat Modification (other than Hydromodification)
- 7600 Removal of Riparian Vegetation
- 7700 Bank or Shoreline Modification/Destabilization
- 7800 Drainage/Filling of Wetlands

7900 Marinas and Recreational Boating*
- 7910 In-water releases*
- 7920 On-land releases*

8050 Erosion from derelict land*
8100 Atmospheric Deposition
8200 Waste Storage/Storage Tank Leaks (above ground)
8250 Leaking underground storage tanks*
8300 Highway Maintenance and Runoff
8400 Spills (Accidental)
8500 Contaminated Sediments
8520 Debris and bottom deposits*
8530 Internal nutrient cycling (primarily lakes)*
8540 Sediment resuspension*
8600 Natural Sources

8700 Recreation and Tourism Activities (other than Boating; see 7900)
- 8710 Golf courses*

8900 Salt Storage Sites
8910 Groundwater Loadings
8920 Groundwater Withdrawal
8950 Other
9000 Unknown Source
9050 Sources outside State Jurisdiction or Borders*

Notes:
Bold type indicates a major source category; regular type indicates a subcategory.
In addition to the above codes, WBS users can enter their own customized source codes.
Code 8000 for "Other" has been deleted because it resulted in significant loss of detail nationwide.
See Appendix G for definitions of selected source categories.
* Codes changed or added since 1996 Guidelines.
** Agriculture is the only major source category with three tiers of codes (such as codes 1000, 1050, and 1100). EPA asks States to report size data for the "1000—Agriculture" code plus one or both of the other two tiers.

How to Avoid Double-Counting of Sources

WBS Users—WBS can be used to generate the 305(b) summary report, "Total Sizes of Waters Impaired by Various Source Categories." *However, to use the WBS to generate this table, enter a total size for each major category of sources (i.e,, the **bold categories** in Table 1-3 such as **1000--Agriculture** and **2000--Silviculture**).* This is necessary because there may be overlap among the subcategories of sources.

Non-WBS Users—Your customized database must also track major source categories (the **bold categories** in Table 1-3) at the waterbody level.

A modeling framework can be helpful, especially where a variety of sources could be involved. Even a simple annual average export-coefficient screening model can help determine if particular source categories are significant contributors to impairment. A well-rounded assessment process, therefore, might involve monitoring, an inventory of land uses and point source contributions for a watershed, and, where appropriate, a screening-level model to rank and prioritize the relative impacts of different source categories.

Appendix H lists types of information that can be used to determine sources of water quality impairment.

Natural Sources

The Natural Sources category should be reserved for waterbodies impaired due to naturally occurring conditions (i.e., not caused by, or otherwise related to, past or present human activity) or due to catastrophic conditions. In the past, some States have used natural sources as a catch-all category for unknown sources. This gives an inaccurate picture of the extent of natural sources at both State and national levels. States should use the natural sources category only for clearly defined cases, including:

- Saline water due to natural mineral salt deposits
- Metals due to naturally occurring deposits
- Low dissolved oxygen (DO) or pH caused by poor aeration or natural organic materials, where no human-related sources are present or where impairment would occur even in the absence of human activity

- Excessive siltation due to glacial till or turbidity due to glacial flour, where such siltation is not caused by human activity or where impairment would occur even in the absence of human activity

- Habitat loss or pollutant loads due to catastrophic floods that are excluded from water quality standards or other regulations

- High temperature, low DO, or high concentrations of pollutants due to catastrophic droughts with flows less than design flows in water quality standards.

The Natural Sources category does **not** include, for example, low flows due to diversions resulting in low DO; drainage from abandoned mines resulting in low pH; stormwater runoff resulting in habitat destruction, high temperatures, or other impacts except under catastrophic conditions; or atmospheric deposition of heavy metals where human-induced emissions are a factor.

In many cases, State water quality standards already take into account natural conditions (e.g., a "fish and wildlife/swamp waters" classification in the Southeast where naturally-occurring low DO is allowed). In such cases, the waterbody is not reported as impaired. In other cases where standards do not allow for natural conditions, impairment by a natural source may still be beyond a State's capability to correct for technical or economic reasons. A use attainability analysis (UAA) should be done to determine if designated uses are attainable or if other uses are more appropriate for a waterbody. Regional Water Quality Standards Coordinators can provide information on conducting UAAs. In the absence of a UAA, EPA recognizes that States should report impairment due to natural sources even in cases where standards could be overly restrictive or in need of revision.

1.8 Cause/Source Linkage

States are requested to link causes/stressors with sources for waterbodies in their assessment databases where possible. A special cause/source link field is provided in WBS for this purpose. Linked cause/source data are important for answering State resource management questions. For example, the question "Which waterbodies are impaired due to nutrients from agricultural runoff?" cannot be answered if the cause/source link is not used.

The following chart illustrates what happens when causes and sources are not linked. Although valuable information is stored, one cannot tell which sources are associated with which pollutants or stressors:

Causes and Sources Not Linked

Waterbody	Causes (pollutants/stressors)	Sources (not linked with causes)
WBID = XX-012 Mill Creek above Brook Branch	Nutrients, siltation, thermal modification	Urban runoff, removal of riparian vegetation, municipal point sources

The following chart shows how the same causes and sources can be associated with each other using the WBS link variable:

Causes and Sources Linked

Waterbody	Causes (pollutants/stressors)	Sources (linked with causes)
WBID = XX-012 Mill Creek above Brook Branch	Nutrients	Urban runoff
	Nutrients	Municipal point sources
	Siltation	Removal of riparian vegetation
	Thermal modification	Urban runoff
	Thermal modification	Removal of riparian vegetation

For help in accomplishing this link, WBS users and non-WBS users are urged to contact WBS Technical Support at the number on page ii for more information.

1.9 Major/Moderate/Minor Contribution to Impairment

Section 4 of the main *Guidelines* volume requests determination of the relative contribution to impairment of causes and sources of pollution.

The definitions of major/moderate/minor contributions in these *Guidelines* now reflect the severity of impairment rather than the number of sources contributing. The 1994 definitions, for example, required that a source be labeled "major" if it is the only source of impairment on a waterbody, regardless of the severity of impairment. The current definitions are:

- Major contribution: A cause/stressor or source makes a major contribution to impairment if it is the only one responsible for *nonsupport* of any designated use or it predominates over other causes/sources.

- Moderate contribution: A cause/stressor or source is the only one responsible for partial support of any use, predominates over other causes/sources of partial support, or is one of multiple causes/sources of nonsupport that have a significant impact on designated use attainment.

- Minor contribution: A cause/source is one of multiple causes/sources responsible for nonsupport or partial support and is judged to contribute relatively little to this nonattainment.

The major/moderate/minor designations are difficult to quantify and will continue to reflect the best professional judgment of the data analyst. For example, multiple minor causes/stressors or sources or multiple moderate causes/sources could be interpreted to add up to nonsupport. States are asked to clarify how they use magnitude codes in their annual electronic reporting data dictionaries.

SECTION 2

DESIGNING ASSESSMENTS AND MANAGING INFORMATION

This section discusses several topics related to the overall operation of State water quality assessment programs:

- The extent of individual assessments
- Comprehensively characterizing waters of the State through a combination of targeted and probabilistic monitoring designs
- Delineating waterbodies and watersheds
- Managing assessment data

2.1 Extent of Individual Assessments

The extent or size of a waterbody that is represented by a given monitoring station is important because it affects the quality of assessment results. For example, low assessment quality can result when a large segment of stream or a large lake is assessed based on a single monitoring site. The 305(b) Consistency Workgroup discussed this topic in 1994 and concluded that only general guidance can be given at this time, as follows.

> A monitoring station can be considered representative of a stream waterbody for a distance upstream and downstream that has no significant influences that might tend to change water quality or habitat quality. A significant influence can be
>
> - A point or nonpoint source input to the waterbody or its tributaries
> - A change in watershed characteristics such as land use
> - A change in riparian vegetation, stream banks, substrate, slope, or channel morphology
> - A large tributary or diversion
> - A hydrologic modification such as channelization or a dam.

Because of the importance of site-specific considerations, EPA discourages the use of uniform default values for the size of waterbody represented by a single monitoring site. For streams, States should consider the upstream and downstream characteristics of each monitoring station and its watershed in arriving at an extent of assessment. A single site should not be used to assess an entire watershed unless land use, sources, and habitat are relatively homogeneous (e.g., as is sometimes the case in undeveloped areas) and the observed stressor is consistent with watershed-wide impacts.

In general, a wadable stream station probably should represent no more than five to 10 miles of stream. For large rivers, EPA believes that 25 miles is a reasonable upper limit for a single station unless stream-specific data demonstrate otherwise. However, some large western rivers may have no significant influences for more than 25 miles, as is the case in New Mexico where a few stations on large rivers are believed to represent 50 to 75 miles each.

For lakes, the factors that affect the number of monitoring sites needed per lake are complex. They include purpose of the sampling, lake size, stratification, morphometry, flow regime, and tributaries. No simple guideline for size assessed per station can be given. Reckhow and Chapra (1983) discuss monitoring design for lakes and the potential problems associated with sampling only a single site. Similarly, no specific guidelines are available for the extent of assessment of estuarine monitoring sites. The Washington Department of Ecology (DOE) has used a GIS to draw circles around each monitoring site; the site is considered to represent the area within its circle. Open water stations represent an area within a 4-mile radius, most bay stations represent an area within a 2-mile radius, and highly sheltered bay sites represent an area within a 0.5-mile radius. DOE uses circles in part to emphasize the uncertainty associated with the extent of assessment for estuarine sites.

EPA asks States to provide information in the Assessment Methodology Sections of their 1998 305(b) reports on how they determine extent of waterbody represented by a single assessment or monitoring site.

2.2 Comprehensive Statewide Assessment

EPA, States and Tribes are moving toward a goal of **comprehensively characterizing waters** of the States and Tribes using a variety of monitoring techniques based on the condition of, and goals for, the waters. Achieving this goal would mean a significant increase in the percentage of waters assessed throughout the Nation. For example, in their 1996 305(b) reports, the States assessed approximately 19 percent of the Nation's total stream miles (including intermittent streams, canals, and ditches); this amounted to less than half of the Nation's perennial stream miles. Achieving the goal of comprehensive coverage will require a combination of monitoring approaches including both targeted and probability-based monitoring as well as aggregation of acceptable data from a variety of agencies and sources. Figure 2-1 shows several aspects of monitoring, assessment, and reporting that will be important to realizing the goal.

The traditional means used by EPA to meet the 305(b) requirements has been to compile information from individual States, Territories, Tribes, and interstate basin commissions. In general, such data come from a diverse set of monitoring programs, each of which is based on its own valid purpose. One of the difficulties that arises from this process is differences in overall objectives. On the one hand, EPA is required to report on the condition of the Nation's aquatic resources as a whole, implying either a national census of the resource or a sample survey from which inferences about the entire resource can be drawn. On the other hand, States often select monitoring locations with specific, local purposes in mind. A compilation of such data for regional or national assessments is subject to question about the representativeness of these locations for making comprehensive assessments; i.e., to what extent might the resultant assessment be biased by the non-random selection of monitoring locations as well as the incomplete coverage of the State or Tribal lands?

Comprehensive Assessment: An evaluation of resources that provides complete spatial coverage of the geographic area or resource being studied; it provides information on assessment value (condition of the resource), spatial and temporal trends in resource condition, causes/stressors and sources of pollution, and locational information.

Sample Survey (Probability-Based) Design: A sampling design based on selection of sites or sample locations using some aspect of randomization; allows statistically-valid inferences to be drawn on a population as a whole.

Conventional or Targeted Design: Targeted site selection is used to answer specific questions regarding the condition of a site or area.

Judgmental (Sample Survey) Design: Non-random selection of sampling sites with the intent of using assessment results for drawing inferences on a population as a whole.

Vision: Multi-year State and Tribal Monitoring Strategy resulting in comprehensive State & Tribal assessment of water quality at various geographic scales. Reporting of the information to foster risk-based management decisions and inform Congress and the public.

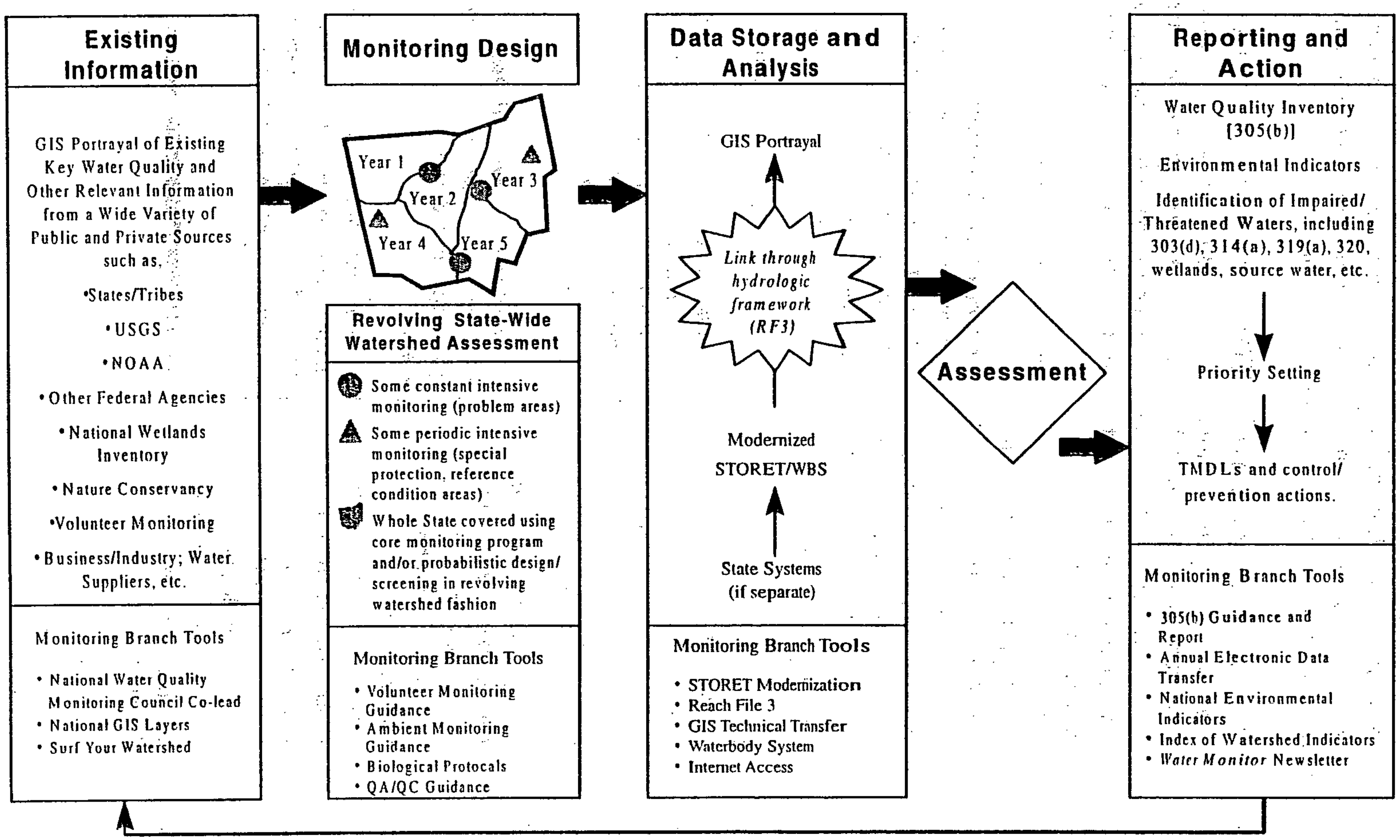


Figure 2-1. Comprehensive Statewide and Tribal water quality assessment

2.2.1 General Types of Monitoring Designs

The section is intended to expand upon these fundamental differences in general objectives; to describe the types of questions each of the monitoring approaches is intended to address and some of the strengths and weaknesses of the approaches; and to provide some initial recommendations toward more comprehensive assessments. The term "sample survey" is used to describe monitoring designs for producing representative data for regional (statewide, basinwide, ecoregional) or national assessments. The term "conventional or targeted" is used to describe monitoring designs that are more local in scope and that tend to focus on a particular problem, or on sites that are selected for a specific local issue. A "judgmental" monitoring design refers to selecting sites for assessing a broader geographic area and assuming that they are representative of that area (non-random selection). EPA recognizes that most States would need to make programmatic or design adjustments in their monitoring efforts to meet national-, regional-, or State-scale objectives as well as more site-specific data needs.

> ***Examples of Monitoring Questions***
>
> Site Specific: What is the biological condition of Jamster Creek? (targeted monitoring design most often used)
>
> Regional: What is the biological condition of lakes in the mid-Atlantic coastal plain? (requires probability-based monitoring design or defensible judgmental design in the absence of a census)

Sample surveys are intended to produce snapshots of the condition of an entire resource when that resource cannot be subject to a census (monitoring of every waterbody). Sample surveys rely on the selection of monitoring sites that are representative of the resource. Randomization in the site selection process is one way to ensure that the sites represent the resource of interest. These surveys are often called **probability-based** or statistical sample surveys.

An alternative is to select sites **judgmentally**, based on some criterion other than randomness. Judgmental selection of sites is based on the judgment of the monitoring agency that the sites are representative of the target resource. Such judgmentally-based sample surveys require strong defense regarding the representativeness of the sites so selected, and it may not be possible to estimate the uncertainty with which inferences are made as it is when using probability-based sample surveys.

Targeted designs allow questions to be addressed that are focused on site-specific problems, and the aggregation of these site-specific results to make comprehensive assessments is open to question regarding the representativeness of those sites to the resource as a whole. State monitoring programs that combine aspects of the two general approaches (survey designs and targeted designs) may be necessary to provide data and assessments useful at multiple geographic scales from site-specific to national. Appendix I provides some of the advantages and disadvantages of probability-based, targeted, and judgmental monitoring and also examples of the types of questions that can be addressed by each.

2.2.2 Planning Process for Probability-based Sampling in a Rotating Basin Design

Considerable planning is required to define the particular classes of waterbodies of interest, but the end result can be a cost-effective, defensible and rigorous process for making inferences about all waterbodies in an area.

The initial step in random selection is definition of the target population (e.g., all lakes over 10 acres or all streams of the State). To characterize all streams of a State, basin, or watershed, the agency would do a simple random selection of locations from within the appropriate boundaries (Figure 2-2). However, stream segments could be stratified based on watershed, stream sizes (e.g., first, second, or third-order), ecoregion, or even predominant land use/land cover. Random selection of stream locations for sampling then occurs within each grouping. Figure 2-3 represents the stratification of streams into three classes. Techniques are available to ensure even distribution of sampling sites among the classes or strata and across the resource (or State or basin). The selection process would depend on geographic scale or monitoring questions and objectives. Such a probability-based design can provide assessment data that are useful not only for each class of streams individually, but that can be aggregated into a broader-scale resource assessment. It would also allow extrapolation of sources and causes/stressors to broader geographic scales.

> ***Target Population (Stratum)***: A group of potential sampling locations (or assessment units) that is some subset of the total population of sampling units.
>
> ***Geographic Scale***: Spatial breadth or size; can be based on political unit (e.g., state, county, or municipality), basin or watershed (e.g., the Anacostia River Watershed, the Columbia River Basin), region (e.g., the Huron-Erie Lake Plain ecoregion, the Pacific coastal Mountain ecoregion), or resource (e.g., the Okefenokee Swamp, the Everglades).

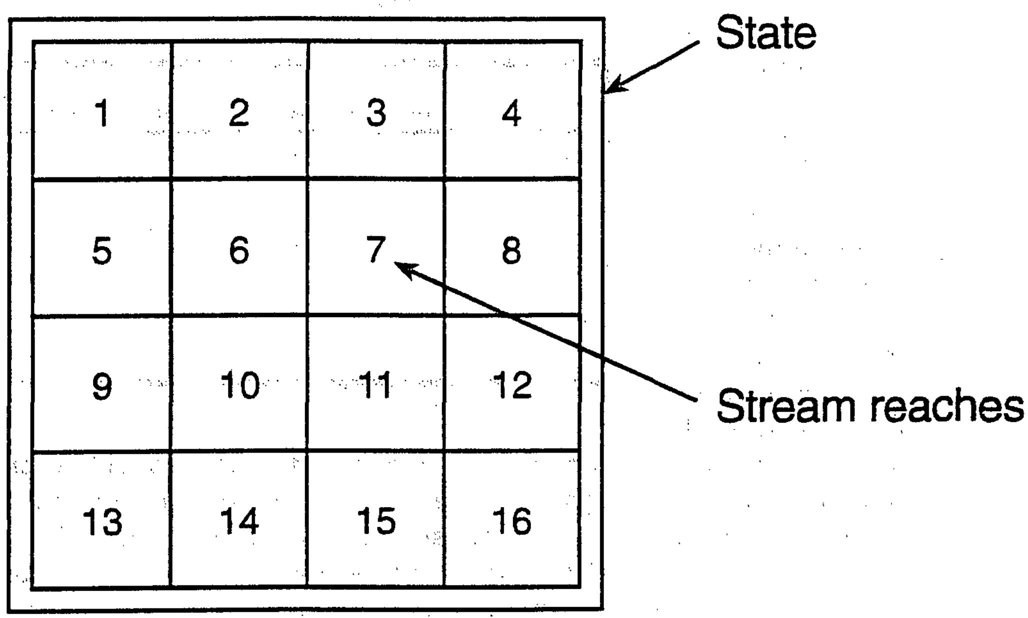


Figure 2-2. Universe of streams from which to draw a random sample

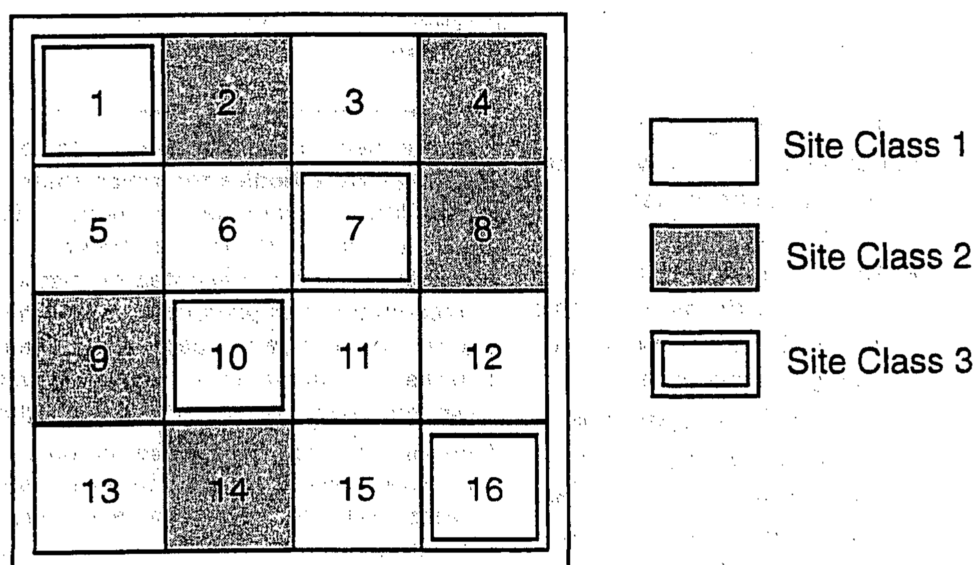


Figure 2-3. Stratification of streams into three classes

2.2.3 Stratified Probability in a Rotating Basin Design

Year	1997	1998	1999	2000	2001
Basin No.	7	9	4	1	10
	15	2	14	5	13
	8	11	3	16	12
	6	-	-	-	-

Incorporating stratified probability design into a monitoring program could enable a more efficient and effective sampling of all of a State's major basins. If a State is willing to select its order of rotating basins randomly, the State could potentially obtain results, even in the early year(s), that are meaningful and valid for statewide assessment. To apply such a design, begin with a random selection of three to four basins to be sampled in each year (Figure 2-4a). The sampling schedule in the text box above is an example of the results for a State with 16 basins. Randomized selection of basins is not necessary, and the State can select the order of basins on a priority basis.

The second phase of site selection is random selection of stream reaches from within each of the basins. For example, there are 16 stream segments in Basin 6 (Figure 2-4b). Random selection of a subset of stream segments from within Basin 6 allows aggregation of assessment results into a statistically-valid basinwide assessment.

> A stratified design can be used to focus on a class of waterbodies for which there has been little previous data collection. For example, larger rivers and streams of some States are well-represented by historical, fixed-station sampling networks, while only a small percentage of headwater streams are assessed. Maryland has applied stratified random design to first- through third-order streams to greatly increase the percentage of its total miles assessed. Delaware selects sampling from all points where roads cross streams.

Referring to the above schedule box, following the 1997 sampling season, there would be four basin assessments to aggregate for a statewide assessment; after 1999, there would be 10 basin assessments to aggregate for a statewide assessment, and so forth. With each subsequent year, the confidence associated with statewide assessments increases. In the first year of the second cycle (2002 in this example), the basin rotation would begin again.

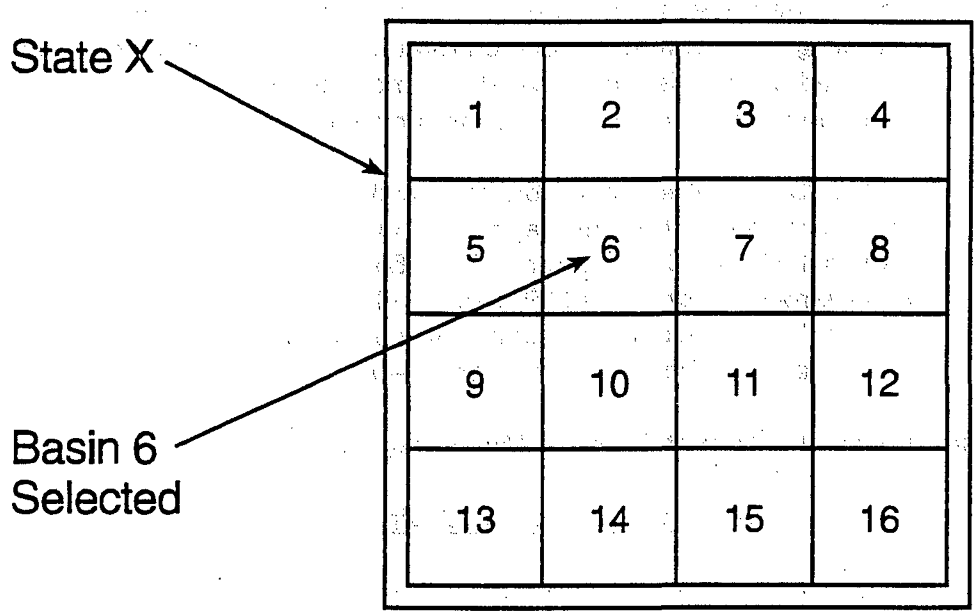


Figure 2-4a. Random selection of basins

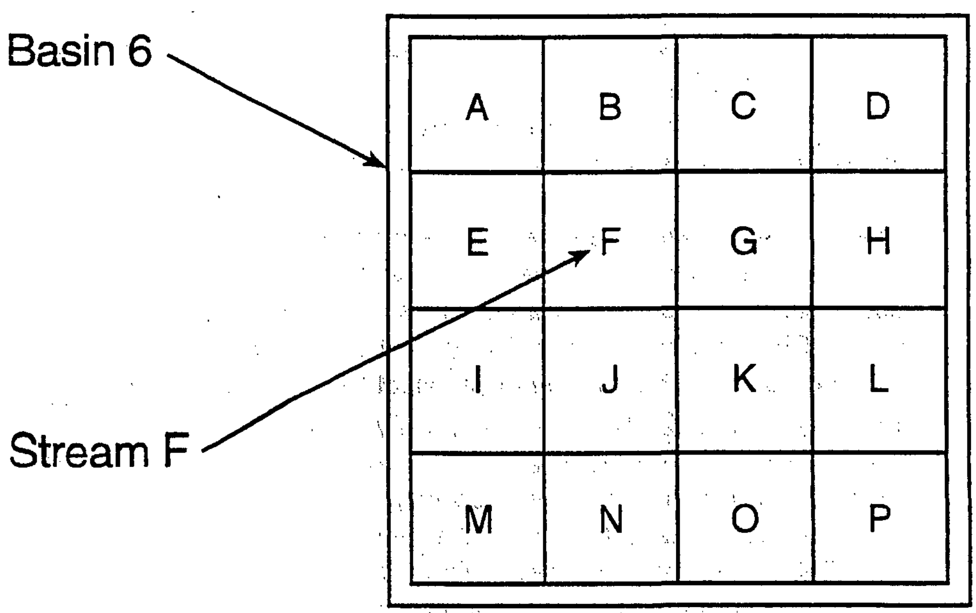


Figure 2-4b. Random selection of streams within a basin

Note: The above is one approach to incorporating probability-based sampling into rotating basin monitoring. Another approach is to use a repeated statewide survey yearly, complimented by targeted monitoring and assessment according to the State's rotating-basin schedule.

EPA/ORD Corvallis is available to provide technical support in designing probability-based rotating basin surveys through coordination with the Regional 305(b) Coordinator. EPA's Environmental Monitoring and Assessment Program (EMAP) has developed expertise in the area of probability surveys and in establishing a mechanism to help States investigate and implement probability-based designs for their specific needs.

2.2.4 Case Studies of Different Types of Monitoring Designs

Probability-based Sample Survey Design: State of Delaware

A probability-based sampling design was developed to assess the ecological condition of Delaware's nontidal streams by the Department of Natural Resources and Environmental Conservation (DNREC). The results were used to produce unbiased estimates of biological and physical habitat condition for the State's 305(b) reports. The area of the State containing nontidal streams was estimated from National Wetlands Inventory data on the State's 35 major watersheds. A list of 3,200 locations where roadways cross a nontidal stream was produced using a GIS. Sampling sites were then selected randomly from this list and sampled during the Fall of 1993. The design was selected to reduce the time necessary to reach specific locations on nontidal streams. The underlying assumption is that road crossings are an accurate representation of nontidal stream resources in Delaware. This assumption is currently being tested.

Ninety-six sites were selected in the northern two counties using this approach; benthic macroinvertebrate and habitat data were collected at all locations. Results of the habitat assessment were presented in Delaware's 1994 305(b) report. The majority of the 1357 miles of nontidal streams in the two counties had impaired physical habitat; 65% were severely impaired (i.e., 'poor') and 22% were moderately impaired (i.e., 'fair'). The habitat results were also reported as three strata within the two counties: one stratum comprising all of Kent County (32 sites); another, the piedmont region of New Castle County (26 sites); and the third, the coastal plain of New Castle County (38 sites). Thus, the probability design allowed reporting of results at two geographic scales: 1) the two counties aggregated, and 2) the two counties individually and separated by physiographic region or topography.

The above description of the Delaware program is taken directly from "The use of a probability-based sampling design to assess the ecological condition of Delaware streams" (Maxted, 1996).

Judgmental Sample Survey Design: State of Washington

This approach is referred to as the 'representative sampling approach' by the staff of the State of Washington, Department of Ecology. They reviewed all existing monitoring stations to determine why existing sampling locations were selected. If stations were selected because they were judged to be representative of the type of water within a watershed, they will be used in the sampling network and aggregated to a statewide assessment. Alternatively, if stations were selected because of their position relative to a known problem, such as those downstream of a specific discharge, they will not be used as part of a statewide assessment. Data from the latter sites will continue to be used strictly for site-specific assessments; the former will provide site-specific assessments that can be aggregated into a regional (statewide, ecoregional) assessment.

All sites determined as appropriate for the statewide assessment will be initially stratified by ecoregion and waterbody type under the assumption that collectively these sites are representative of all waters within their particular stratum. This assumption will be tested by direct comparison to results provided by the strictly probabilistic design of EPA Region 10 REMAP. Although one concern may be that the selection process could be biased against selecting problem sites, preliminary results show an increased percentage of stations exhibiting impairment compared to a strict probability design.

The Washington Department of Ecology provided background material for the above description of their program.

Combined Probability-based Sample Survey and Conventional Designs: Prince George's County, Maryland

The Prince George's County Department of Environmental Resources (DER) recently designed and piloted a county-wide biological monitoring program. The County is located in the middle Atlantic coastal plain region and has flowing surface waters that drain into the Patuxent and Potomac Rivers, which themselves drain into the Chesapeake Bay. The County wants to answer questions at various geographic scales including stream-specific, watershed-wide, and county-wide and to have sampled all watersheds over a 5-year period. It was necessary to be able to have valid county-wide assessments from the first year of the program and to be able to address problems from known point sources.

NPS Monitoring and Evaluation Guide

A nonpoint source (NPS) pollution monitoring and evaluation (M&E) guide is available for use by those who fund and approve M&E plans and those who perform the monitoring. The guide discusses the various objectives of NPS pollution M&E, biological monitoring for NPS pollution, and qualify assurance/quality control aspects, and includes an extensive chapter on statistical methods for the evaluation of NPS pollution monitoring data. Appendices contain abstracts and content listings of over 40 guidance documents related to monitoring both point and nonpoint source pollution programs.

Federal, State and regional agencies that support M&E activities might use the guide to assess the technical merit of proposed plans. Those agencies, private groups, and university personnel that perform M&E might use the guide to formulate their plans. The guide is in no way intended to supersede proven NPS pollution M&E plans currently in use, but it is intended as both a check against existing plans and an outline for developing new NPS pollution M&E plans. To obtain a copy contact the NPS Branch at (202) 260-7110.

The unit of assessment was defined as a channel segment of a wadable, nontidal river or stream into which no tributary flows. The number of assessment units within the County was determined from maps to be approximately 1000. This target population was prestratified (subdivided or grouped) by the following: northern and southern parts of the County, watershed, and order (first through fourth). Step 1 was to randomly select four to five watersheds (alternating between north and south) until about 25 percent of the total population, or 200 stream segments, had accumulated. Then, from within each watershed, approximately 25 percent from each of the groups of first, second, and third order segments were randomly selected. Fourth order segments, if they were represented in a particular watershed, were automatically selected since their occurrence was so rare within the County. This process resulted in a rotating basin design where, over a 6-year period, a total of 254 probability sites would be sampled per index period. Each of the 41 watersheds would have 25 percent of its first order streams sampled, 25 percent of its second order, and 25 percent of its third order.

Twenty to 25 specific streams with known problems or special projects would also be sampled and would be used for evaluating the effectiveness of stream restoration projects, remediation of stormwater outfalls, implementation of BMPs, or the effects of specific discharges.

2.2.5 Improving Monitoring Designs through Modeling

Calibrated empirical and process models hold the potential to estimate in-stream quality based on landscape and other stressor factors. This active area of research links landscape ecology with instream indicators of biological, habitat and chemical quality (e.g., correlating the Index of Biological Integrity with land use and other factors). While probability-based monitoring gives reliable estimates of condition over wide areas, models can provide comprehensive screening for potential problem areas that should be sampled to confirm problems. That is, calibrated empirical and/or process models relating landscape and other stresses to instream condition can potentially provide reliable estimates of where additional problems are likely to be found and thus can result in better targeted monitoring approaches. Statisticians refer to this approach as "model-based inferences." These models may be an additional tool for States in their efforts to use all available monitoring network approaches to answer key questions such as: "what is the desired condition, where are our problems, and are we making progress over wide areas over time?" A potential synergy among approaches is that data from probability-based efforts could be used to construct the models needed for better screening and targeting. References regarding linking landscape ecology with instream indicators of biological habitat and chemical quality include Zucker and White (1996), Roth et al. (1996), Jones et al. (1996), and U.S. Department of Agriculture, 1996.

2.3 Watershed and Waterbody Delineation

The waterbody is the basic unit-of-record for water quality assessment information. That is, most States assess individual waterbodies and store assessment results at this level--results such as degree of use support, causes/stressors, sources, and type of monitoring. The States have defined waterbodies in various ways, from short stream segments and individual lakes to entire watersheds.

The paragraphs below describe features of watersheds and waterbodies and common approaches to their delineation. One goal of this section is to help States make the best decisions about watershed and waterbody delineation, thereby avoiding their need to repeat the process later. Another goal is to ensure that whatever process is selected, it will result in data that can be related to standard watersheds such as USGS Cataloging Units and Natural Resources Conservation Service (NRCS) watersheds to allow data aggregation at various scales. **The proper delineation of individual waterbodies is time-consuming but critically important to a State's 305(b) program. Many States have found it necessary to re-delineate waterbodies after only a few years based on previously unrecognized data needs. EPA urges any State that is considering re-delineating its waterbodies to contact the National 305(b) Coordinator for information about approaches and the experience of other States.**

USGS Hydrologic Units

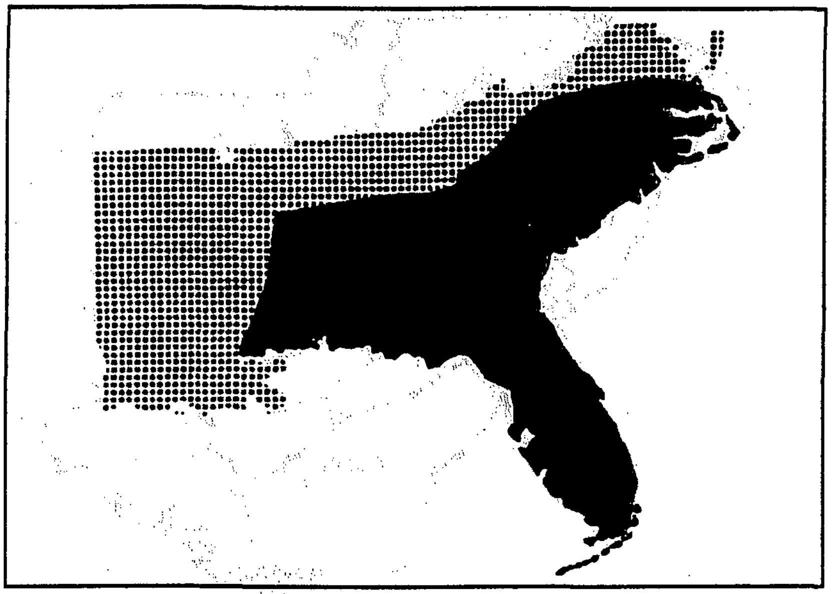
The Hydrologic Unit Code (HUC) is a system developed by the USGS and adopted as a national standard. This system divides the United States into four levels of hydrologic units for purposes of water resources planning and data management:

- Region (2-digit code)
- Subregion (4-digit code)
- Accounting Unit (6-digit code)
- Cataloging Unit (8-digit code)

Note: NRCS has added two additional levels of watersheds. Figure 1-3 shows an 8-digit USGS Cataloging Unit and a 14-digit NRCS small watershed.

The following illustrations show how the hydrologic unit classification is applied to a portion of the State of South Carolina.

South Atlantic - Gulf Region 03

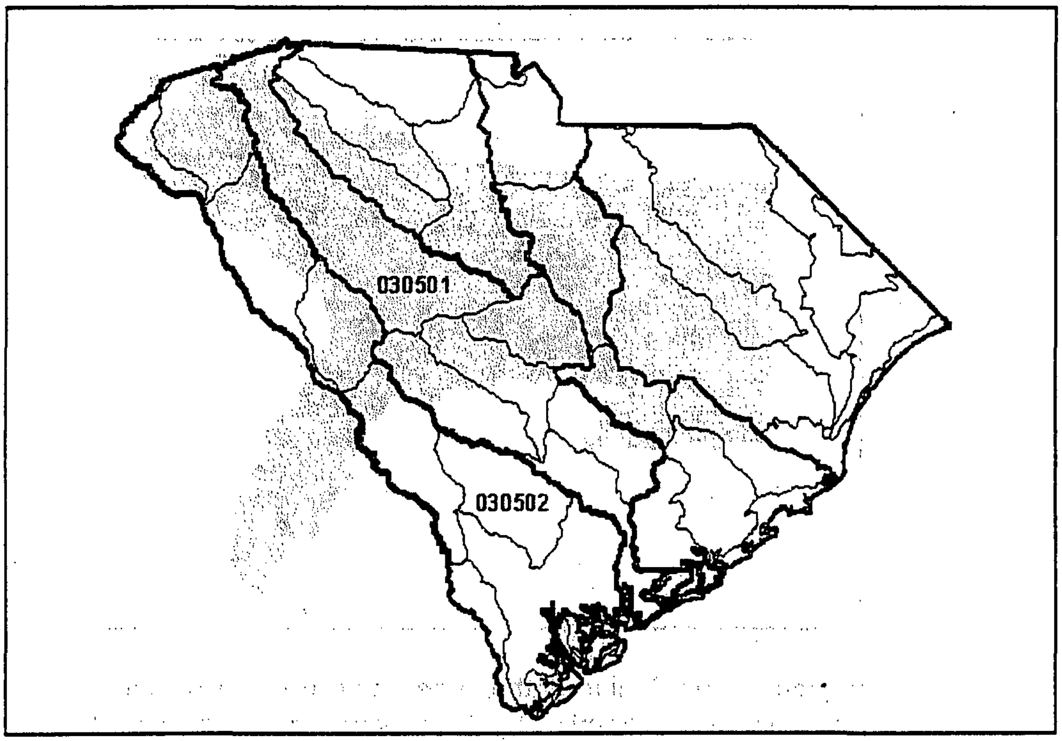


Regions - The Region is the largest unit that USGS uses for comprehensive planning. For example, the South Atlantic-Gulf Region 03 extends from the coastline to the Blue Ridge, and from southern Virginia through the Southeast to New Orleans, Louisiana. There are 18 regions in the conterminous United States, with a national total of 21 (including Alaska, Hawaii, and Puerto Rico and the Virgin Islands).

Subregions and Accounting Units - Subregions are defined by major river basins. For instance, in South Carolina, subregion 0305 includes the Saluda, Broad, and Santee Rivers and the Edisto system. Accounting Units are aggregations of Cataloging Units used by USGS to organize water resource data into manageable units. The South Carolina data in Subregion 0305 are organized into 030501--the Santee, Saluda, Broad Rivers accounting unit--and 030502--the Edisto River accounting unit.

Cataloging Units (CUs) - The CU is the lowest level of hydrologic classification by USGS for planning and data management. There are 2,111 CUs in the continental United States. The 8-digit HUC number designates each individual CU. In the previous graphic, the lines within Accounting Unit 030501 are CU boundaries and each CU has a unique 8-digit HUC.

The HUC has been adopted as a Federal Information Processing Standard (FIPS); i.e., the HUC is a mandatory standard for Federal agencies describing hydrologic data. The HUC classification is well accepted by professional planners and hydrologists at all levels of government and in the private sector.



NRCS Watersheds

Years ago, the Soil Conservation Service (now the Natural Resources Conservation Service) subdivided the CUs into watersheds, appending three digits to the eight digit HUC (CU+3). The designations were made by each State Conservationist to create smaller units for planning activities. There were some consistency problems with the earlier designations, with inharmonious sizes from State to State and a lack of common standards for base maps. Now NRCS Headquarters, working with USGS, EPA, and others, is aggressively pursuing better coherence in the nationwide delineation and standardizing use of the 11-digit watershed code. NRCS is in the process of subdividing States into 14-digit small watersheds (CU + 3 + 3) for planning and analysis at an even finer scale. For example, NRCS in North Carolina worked closely with State environmental agencies to delineate 1,640 14-digit watersheds averaging about 19,000 acres each (see Figure 2-5).

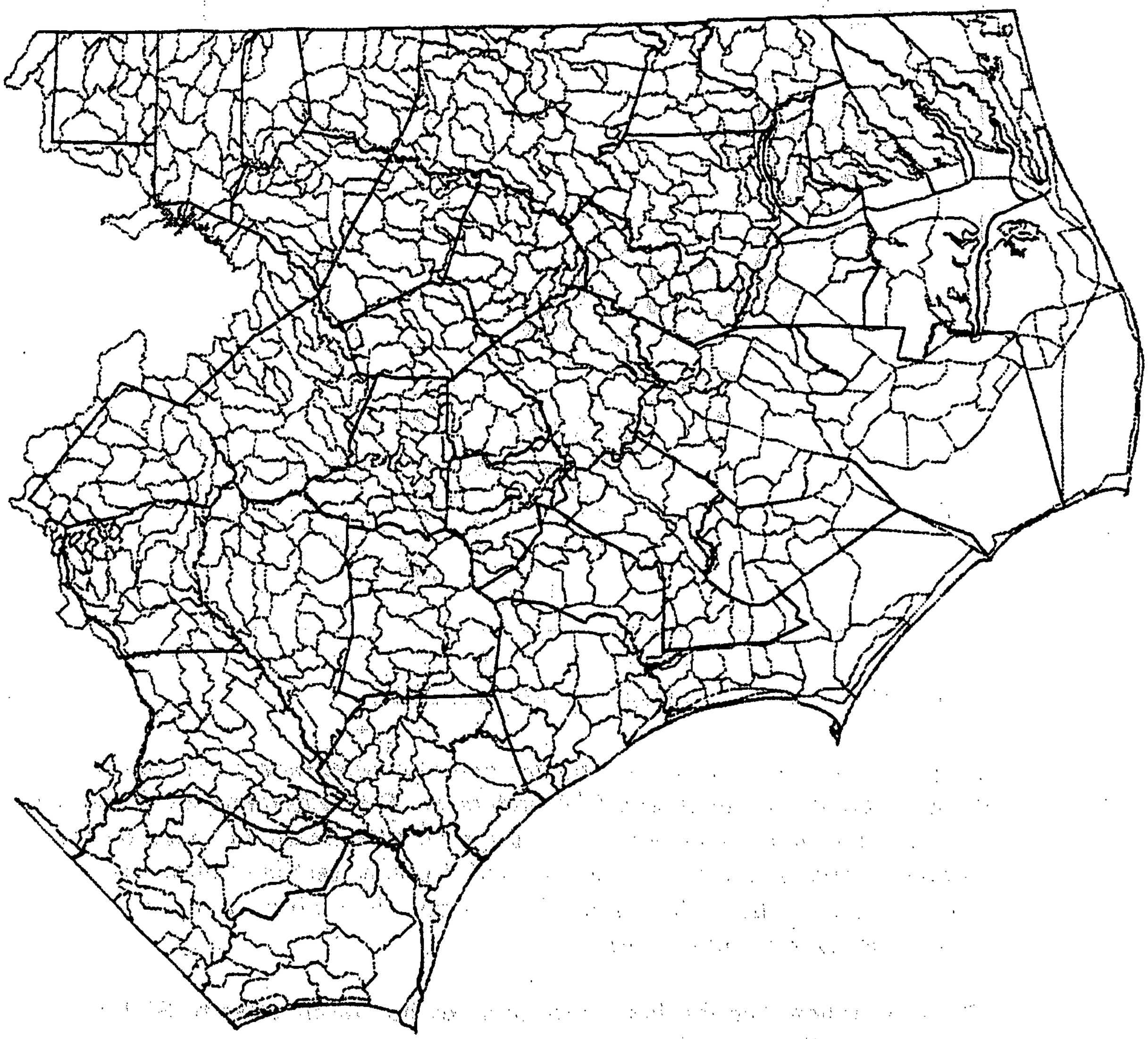
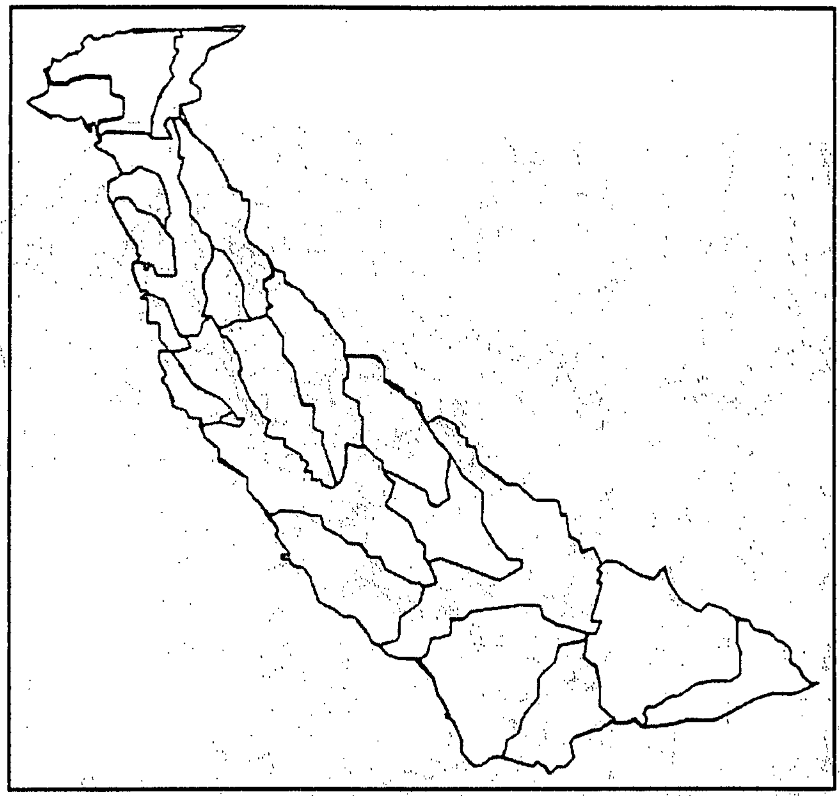


Figure 2-5. 14-digit SCS Watersheds in Eastern North Carolina
(dark lines are county boundary)

NRCS 11-Digit Watersheds in Cataloging Unit 03050109



NRCS Watersheds as a Common Watershed Base

Many States are seeking to establish common watersheds for use by all State agencies, an approach EPA endorses. The watershed level that seems to offer the most advantages, and is the most frequently chosen by the States, is the NRCS watershed. Use of these watershed boundaries allows easy access to NRCS data and improves coordination of nonpoint source assessments with other agencies.

South Carolina was the first State to index its waterbodies to RF3 and it used the NRCS watershed as the basis for waterbody designation. At first, use support, cause/stressor, and source information was tracked only at the watershed level, but this proved too generalized for use in some specific State decisions. The State then went back and identified use support, causes/stressors, and sources for individual stream segments, which proved to be a useful level of resolution. One goal in any delineation scheme is to assemble data at a resolution sufficient to answer the questions that are important for management, without spending more resources than necessary to obtain data.

South Carolina, on the basis of information developed in its first GIS effort, also developed some important locational information at significantly higher resolution. They used global positioning system (GPS) technology to accurately identify the location of discharges. They are proceeding basin by basin throughout the State. Their GIS now has obvious value as a tool for management.

This type of functionality will become increasingly important as tools such as ArcView become available.* These tools, together with the GIS coverages produced by EPA's Reach Indexing project, will allow States to analyze their waterbody and stream reach data spatially. The WBS route system data model (RTI, 1994) allows the State to geographically identify specific use support classifications down to the reach segment level. The EPA contact for georeferencing waterbodies to RF3 is given on page ii.

Waterbody Delineation

Waterbodies have been defined on a wide range of criteria--from individual RF2 reaches, frequently used from 1986 to 1988, to NRCS watersheds or other groupings conforming to administrative boundaries. Tracking of individual RF3 reaches for the 305(b) report gives detailed resolution to waterbody data but can complicate workload management. On the other hand, watershed-scale waterbodies may fail to give sufficient detail for mapping and management decisions unless they identify the actual locations of use support classifications and causes/stressors and sources of impairment.

EPA recommends that States delineate waterbodies to be compatible with NRCS 11- or 14-digit watersheds. "Compatible" can mean for example that multiple stream and lake waterbodies lie entirely within the watershed's boundaries but can be mapped individually (i.e., do not cross NRCS watershed boundaries). Where 14-digit watersheds will be delineated in the near future, a State might consider waiting for these boundaries before redelineating waterbodies. Figure 2-5 shows some of the 14-digit watersheds agreed upon by NRCS and the State of North Carolina.

* Mention of trade names in this document does not constitute endorsement. ArcView is a program that enables nonprogrammers to utilize ARC/INFO coverages to do mapping and spatial analysis. ARC/INFO and ArcView (Environmental Systems Research Institute, Inc., ESRI) are the only GIS packages currently in wide use by EPA and State water agencies.

Table 2-1 describes an approach to delineating waterbodies that is consistent with aggregating data at the watershed level. A cornerstone of any approach should be flexible data management. That is, the level of detail of assessment data can vary from watershed to watershed depending on the unique causes/stressors and sources in each watershed. **EPA urges any State that is considering re-delineating its waterbodies to contact the National 305(b) Coordinator for more information about options and experiences of other States.**

Aggregating Assessment Data at Watershed, Basin, and Ecoregion Levels

EPA recommends that States store assessment data at the most detailed level of resolution they can manage—generally at the level of stream segment, individual lake, or very small homogeneous watershed. EPA encourages States to develop the **capability** to aggregate their waterbody-level assessment data to the watershed, basin, and ecoregion levels. EPA is not asking States to present aggregated assessment data by NRCS watershed, USGS HUC or ecoregion in the 305(b) report, but rather to develop the capability to do so by including appropriate locational data. However, if States prepare basin management plans, States are encouraged to begin reporting aggregated data in them (see Appendix E).

Using CUs or NRCS watersheds as basic units for aggregating water quality assessment data will aid in data integration and in making other agencies' data available to the States. Sufficient locational information should be included to allow aggregation of detail at a minimum at the CU level. CU numbers can be stored, for example, in WBS SCRF1 or SCRF2 files. At a minimum, WBS or other State 305(b) databases should contain watershed identification numbers for each waterbody and, to the extent possible, waterbodies should not cross NRCS or CU watershed boundaries. Assessments can also be aggregated by ecoregion if ecoregion codes are stored in WBS for each waterbody, or in combination with a GIS coverage of ecoregions. Note: If waterbodies are georeferenced to RF3, and a GIS is available, aggregation of assessments to watersheds and ecoregions can be done with the GIS.

Reach Indexing Waterbodies to RF3

Reach indexing or georeferencing is the process of electronically linking a State's waterbodies and other water quality information to the EPA Reach File. Within the next year, RF3 will be incorporated into a new National Hydrography Dataset (NHD), with increased flexibility, accuracy, and GIS compatibility. The NHD will become the official hydrologic database for USGS, EPA, and other agencies. The main product of reach indexing is a GIS coverage containing locations of waterbodies, stream networks and

Table 2-1. Approaches for Delineating Waterbodies

Approach	Description	Advantages, Disadvantages, Comments
Waterbodies include individual stream segments, stream networks, and lakes	Several States use a mix of waterbodies: • mainstem stream segments • individual tributaries or segments • individual lakes • stream networks--tributaries in a small homogeneous watershed can make up one waterbody • lakes in a small watershed can make up one waterbody • individual estuaries or portions of estuaries (polygons) Waterbodies do not cross CU or NRCS watershed boundaries	Provides flexibility in the number of waterbodies and in level of detail State wants to track ARC/INFO route systems and dynamic segmentation can be used to add greater detail for selected waterbodies if needed. States can learn from other States' experiences Ideally, the number of waterbodies should be in a tractable range--recommend keeping the total below 2,000 to 4,000 waterbodies depending on the size of the State With georeferencing to RF3, this approach is powerful in its ability to interface with GIS and EPA databases. For tracking and reporting by watershed, watershed boundaries can be overlaid on these waterbodies using a GIS, or watershed ID numbers can be stored in WBS

flows, and other information. This gives the State powerful mapping and spatial analysis capabilities. In 1996, at least a dozen States incorporated color maps of uses support, causes and sources into their 305(b) reports and other documents such as basin plans. The reaction to this mapping capability has been very positive. Assessment results displayed in map form are much easier for managers and the public to understand than the traditional tabular or printout form.

2.4 Managing Assessment Data

The EPA Waterbody System (WBS) is a PC system of water quality assessment information used by nearly half of the States with 305(b) databases. Most other States have developed and maintain their own customized systems. WBS was developed by EPA for States and other entities specifically for tracking and reporting assessments under 305(b). It provides a standard format for water quality assessment information and includes a software program for adding and editing data, linking to other water databases, generating reports, and transferring data between the PC and GISs.

WBS has four main functions:

- To reduce the burden of preparing reports required under Sections 305(b), 303(d), 314, and 319 of the Clean Water Act

- To improve the quality and consistency of water quality reporting among the States

- To provide data for national level assessments and for analyzing water quality issues outside of 305(b)

- To be a useful water quality management tool for State agencies.

These 305(b) *Guidelines* and user requests determine the features of the WBS. The *Guidelines* require States to track dozens of data types for each waterbody (each State has from several hundred to several thousand waterbodies) in order to generate the summary tables required in Section 4 of the main volume of these *Guidelines*. Although most WBS features result from the 305(b) *Guidelines*, WBS also contains some data elements that States have requested for internal management purposes (e.g., georeferencing fields and memo fields).

WBS contains over 100 data elements in such categories as:

- Descriptors — waterbody name, number, description, type (stream, lake, etc.), size
- Locational data elements — Reach File coordinates, basin and watershed identifiers
- Assessment data — degree of use support for each use, size impaired, causes/stressors and sources, type of monitoring, type of assessment, assessment confidence.

For detailed information about the WBS, see the *WBS Users Guide*. EPA also provides ongoing technical support to WBS users. Between January and August 1996, EPA provided consultations to more than 30 agencies, including States, Territories, Tribes, and Interstate Commissions, on the use of WBS and RF3 for 305(b) programs. Contact WBS Technical Support at the telephone number on page ii.

Data Management Options for Aggregating Data by Watershed

At least three options are available for aggregating assessment data by watershed for basin management plans and other purposes. These options are compatible with WBS and the approaches described in Table 4-1.

1. Entirely within WBS or other State assessment database. If waterbody records contain CU or NRCS watershed numbers, the database can aggregate data to that level automatically.

2. WBS or other State assessment database in combination with a GIS program. WBS can be used to store assessment data in combination with GIS programs such as ARC/INFO or ArcView, which enable users to analyze spatial data and prepare maps. ArcView runs on personal computers and users do not need to learn the ARC/INFO programming language. It uses standard ARC/INFO data coverages (e.g., reach-indexed waterbodies or STORET monitoring stations). (See previous note regarding mention of trade names.)

3. Entirely within the GIS environment. States with full GIS capability (e.g., having access to ARC/INFO programmers and workstations) can manage assessment data within the GIS environment and export results to WBS or other programs for reporting.

SECTION 3

MAKING USE SUPPORT DETERMINATIONS

This section presents EPA's recommended approaches to making use support decisions. Designated uses are assigned to individual waterbodies in a state's water quality standards. Types of designated uses include: aquatic life, fish consumption, recreational uses such as swimming, and drinking water. This guidance is drafted for wadeable streams and rivers. However, the approach is applicable to other types of waterbodies, as well.

3.1 ITFM Recommendations for Monitoring

The Intergovernmental Task Force on Monitoring Water Quality (ITFM) was formed in 1992 to develop recommendations on monitoring to achieve more comparable and scientifically defensible information, interpretations, and evaluations of water-quality conditions across the nation. The ITFM comprised both Federal and State agencies responsible for monitoring and assessment programs as well as an associated advisory committee including municipalities, academia, industry, etc. (ITFM 1995). The ITFM subsequently developed a model for stream monitoring for different types of designated uses based on a combination of biological, physical, and chemical monitoring (Figure 3-1). The model defines the relationship between parameters that directly measure the condition of the biotic community and its response over time to stressors, such as fish and benthic macroinvertebrate indices, and parameters that measure either stressors or exposure of organisms to stressors, such as levels of pH, nutrients, and toxicants. For streams, EPA recommends that States incorporate ITFM's suite of parameters in their monitoring programs for evaluating attainment of designated uses. These are general recommendations to consider when developing and revising monitoring programs. For example, monitoring for aquatic life use would include the base monitoring program parameters in the box--community level biological data from at least two assemblages, habitat, and physical/chemical field parameters—plus ionic strength, nutrients, and toxicants in water and sediment.

The ITFM in May 1997 became a permanent National Water Quality Monitoring Council to facilitate, among other tasks, the development and implementation of the recommendations on specific methods for measuring

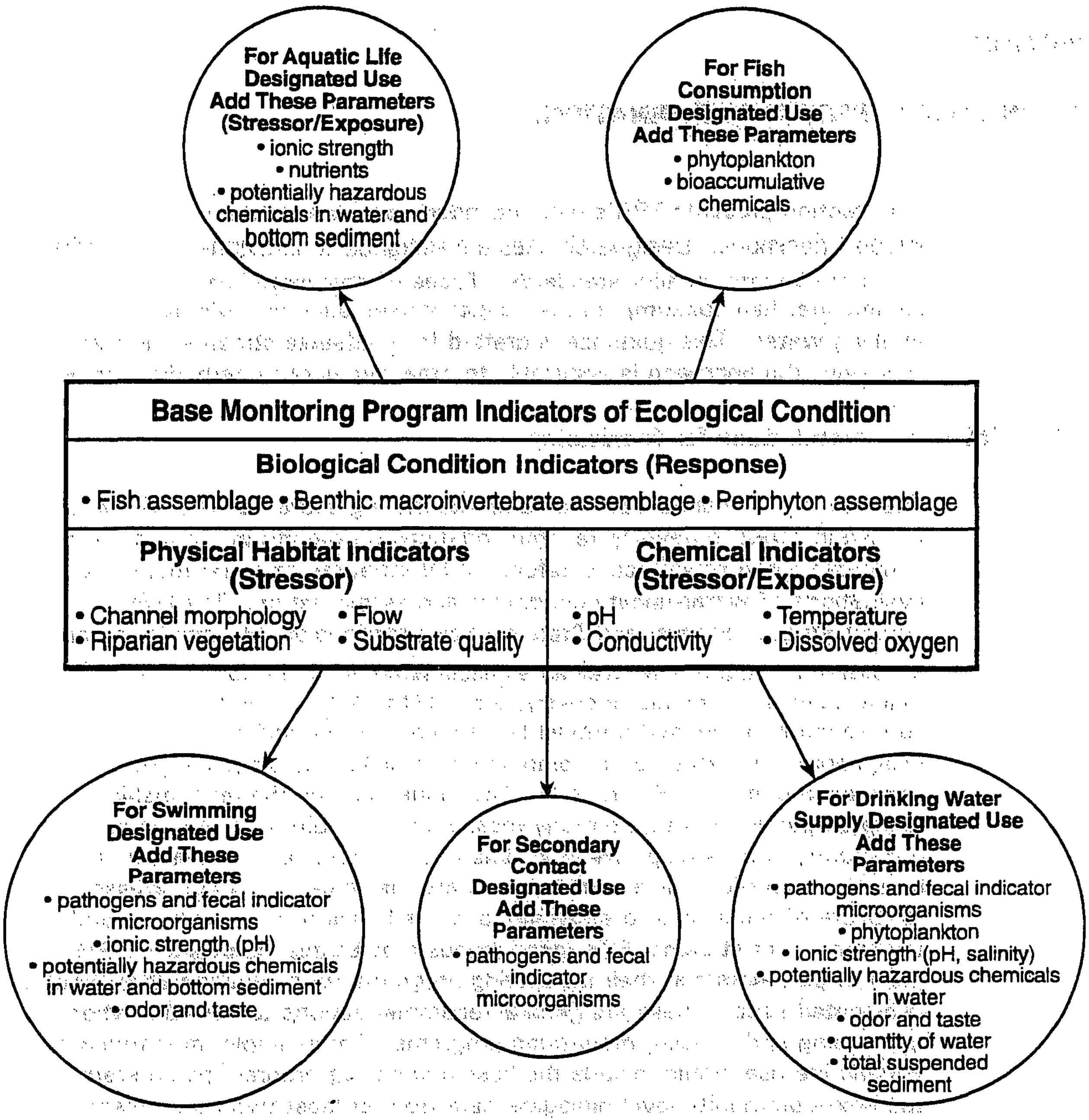


Figure 3-1. Monitoring for different designated uses based on a combination of biological, physical, and chemical measures

the parameters shown in Figure 3-1. Standard methods for measuring the chemical parameters and conducting toxicity tests are well established among the States, but methods for biological and habitat assessments are not standardized for all types of waterbodies. Recent work by the Ohio EPA suggests that bioassessment methods differ widely in their accuracy and discriminatory power for aquatic life use determinations (Yoder et al., 1994). Ohio evaluated a hierarchy of bioassessment approaches relevant to differing levels of rigor and confidence. In their State, Ohio EPA found that less intensive bioassessment approaches tend to be accurate **in detecting impairment**, but may give a false indication of full support in reaches where the methods are not rigorous enough to detect subtle problems.

ITFM (1995) recommends that to combine data for assessment, monitoring data produced by different organizations should be comparable, of known quality, available for integration with information from a variety of sources, and easily aggregated spatially and temporally. This is important at a variety of scales, up to and including national assessments. If different methods are similar with respect to the quality of data each produces, then data from those methods may be used interchangeably or together (Diamond et al. 1996). As data quality (i.e., precision, sensitivity) increases, the confidence in the assessment increases. Data quality objectives should be defined for each method so that assessments can be validated by imposing a known level of confidence in the results.

Monitoring Design

Any monitoring and assessment program begins with setting goals and a monitoring design that can meet those goals. The history of water quality monitoring is replete with programs that could not answer key questions. Examples include:

- A watershed study where the monitoring organization assumes that flow data can be obtained after the fact based on "reference point" measurements from bridges, only to learn later that many streams lack the channel morphometry to develop a stage-discharge relationship;
- An intensive survey where the laboratory's detection levels for metals prove inadequate to detect even concentrations above water quality standards;
- A basin survey where management or the legislature poses the question "What is the statistical trend in biological condition of our streams?" too late to be incorporated into the monitoring design.

As discussed in Section 2, EPA has a goal of comprehensively characterizing the Nation's streams, rivers, lakes, wetlands, estuaries, and shorelines. These assessments will include monitored and evaluated assessments and may involve probability-based as well as targeted monitoring. To achieve this goal, EPA encourages States to incorporate a formal process of goal setting and monitoring design while meeting their own State-specific goals. ITFM provides general guidelines for the topics to consider in monitoring design in a technical appendix of its final report (ITFM, 1995), and EPA's Section 106/604(b) monitoring guidance tailors the ITFM guidelines to the 106/305(b) process.

The Data Quality Objectives (DQO) process developed by EPA's Quality Assurance Management Staff is a specific approach to monitoring design that has been applied to monitoring programs in all media. The DQO process involves the stakeholders in the program in the design. Stakeholders itemize and clarify the questions being asked of a monitoring program, including the required level of accuracy in the answers. Generally, these questions are stated in quantitative terms ("What are the index of biotic integrity [IBI] and invertebrate community index [ICI] values for wadable streams in Big River Basin, and what is the trend in IBI across the basin, with 80 percent certainty?"), and statistical methods may be recommended for selecting sites or sampling frequency. For information about DQOs for water quality monitoring contact the Assessment and Watershed Protection Division at (202) 260-7023.

To date, States have taken three main approaches to monitoring a large portion of their waterbodies:

- Fixed-station networks with hundreds or thousands of sites (most large networks have been reduced in the past 10 years)
- Rotating basin surveys with a large number of monitoring sites covering thousands of miles of waters (Ohio EPA's bioassessment program)
- Rotating basin surveys with a probabilistic monitoring design; a statistically valid set of sites are selected for sampling in each basin (Delaware's benthic macroinvertebrate program).

The National Water Quality Monitoring Council may make recommendations about monitoring design; in the meantime, however, EPA encourages States to consider existing approaches such as Ohio's and Delaware's. In particular, EPA urges States to take advantage of monitoring data provided by other agencies such as USGS, NOAA, or the U.S. Fish and Wildlife Service (USFWS). See Section 2 for more information about comprehensive assessments using different monitoring designs.

3.2 Aquatic Life Use Support (ALUS)

The EPA/State 305(b) Consistency Workgroup has begun to implement the ITFM recommendations including how to integrate the results of biological, habitat, chemical and toxicological assessments in making a determination of aquatic life use support (ALUS). This approach includes consideration of assessment quality as indicated by levels of information of the different data types in evaluating the degree of impairment (partial support vs nonsupport) when there are differences in assessment results. Level of information is discussed below and described for each data type in Sections 3.2.1 through 3.2.4, Tables 3-1 through 3-4. Guidance on making assessments of ALUS for each individual data type is included in Sections 3.2.1 through 3.2.4. Guidance and case studies on integration of the assessment results from different data types, including consideration of level of information and site specific conditions, are presented in Section 3.2.5.

Level of Information

In 1994, the 305(b) Consistency Workgroup concluded that descriptive information characterizing the level of information, or rigor, in the method is needed to more fully define an assessment of use support. Documenting this information is important because users often need to know the basis of the underlying information. The Workgroup recommends that assessment quality information become a part of State assessment data bases. Consequently, the Workgroup has developed guidance for evaluating the level of information of methods used in making ALUS.

Data types are grouped into four categories: biological (Table 3-1), habitat (Table 3-2), toxicological (Table 3-3) and physical/chemical (Table 3-4). A hierarchy of methods corresponding to each data type and ordered by level of information is summarized in the tables. The rigor of a method within each data type is dictated by its technical components, spatial/temporal coverage, and data quality (precision and sensitivity). In the data type tables, Level 4 data are of highest quality for a data type and provide relatively high level of certainty. Level 1 data represent less rigorous approaches and thus provide a level of information with greater degree of uncertainty. However, in situations where severe conditions exist, a lower level of assessment quality will be adequate. For example, a severely degraded site can be characterized as impaired with a high level of confidence based on a cursory survey of biota or habitat, as in the case of repeated fish kills or severe sedimentation from mining. Data in Levels 1 through 4 vary in strengths and limitations, and, along with site-specific conditions, should be evaluated carefully for use in assessments. Data not adequate for ALUS determinations should be excluded from the assessment.

Table 3-1. Hierarchy of Bioassessment Approaches for Evaluation of Aquatic Life Use Attainment Based on Resident Assemblages

Level of Info[a]	Technical Components	Spatial/ Temporal Coverage	Data Quality[b]	WBS Codes[c]
1	Visual observation of biota; reference conditions not used; simple documentation	Limited monitoring; extrapolations from other sites	Unknown or low precision and sensitivity; professional biologist not required	310, 320, 350, 322
2	One assemblage (usually invertebrates); reference conditions pre-established by professional biologist; biotic index or narrative evaluation of historical records	Limited to a single sampling; limited sampling for site-specific studies	Low to moderate precision and sensitivity; professional biologist may provide oversight	310, 320, 322, 350
3	Single assemblage usually the norm; reference condition may be site-specific, or composite of sites (e.g., regional); biotic index (interpretation may be supplemented by narrative evaluation of historical records)	Monitoring of targeted sites during a single season; may be limited sampling for site-specific studies; may include limited spatial coverage for watershed-level assessments	Moderate precision and sensitivity; professional biologist performs survey or provides training for sampling; professional biologist performs assessment.	310, 315, 320, 321, 330, 331, 350
4	Generally two assemblages; but may be one if high data quality; regional (usually based on sites) reference conditions used; biotic index (single dimension or multimetric index)	Monitoring during 1-2 sampling seasons; broad coverage of sites for either site-specific or watershed assessments; conducive to regional assessments using targeted or probabilistic design	High precision and sensitivity; professional biologist performs survey and assessment	310, 315, 320, 321, 330, 331, 340, 350

NOTE: Table is based on use in lotic systems. With some modification, these approaches would apply to other waterbody types.

[a] Level of information refers to rigor of bioassessment, where 1 = lowest and 4 = highest.

[b] Refers to ability of the ecological endpoints to detect impairment or to differentiate along a gradient of environmental conditions.

[c] WBS Assessment Type Codes from Table 1-1.

Table 3-2. Hierarchy of Habitat Assessment Approaches for Evaluation of Aquatic Life Use Attainment

Level Of Info[a]	Technical Components	Spatial/ Temporal Coverage	Data Quality[b]	WBS Codes[c]
1	Visual observation of habitat characteristics; no true assessment; documentation of readily discernable land use characteristics that might alter habitat quality; no reference conditions	Sporadic visits; sites are mostly from road crossings or other easy access	Unknown or low precision and sensitivity; professional scientist (biologist, hydrologist) not required	365
2	Visual observation of habitat characteristics and simple assessment; use of land use maps for characterizing watershed condition; reference condition pre-established by professional scientist	Limited to annual visits and non-specific to season; generally easy access; limited spatial coverage and/or site-specific studies	Low precision and sensitivity; professional biologist or hydrologist not involved or only correspondence	370
3	Visual-based habitat assessment using standard operating procedures (SOPs); may be supplemented with quantitative measurements of selected parameters; conducted with bioassessment; data on land use compiled and used to supplement assessment; reference condition used as a basis for assessment	Assessment during a single season usually the norm; spatial coverage may be limited or broad and commensurate with biological sampling; assessment may be regional or site-specific	Moderate precision and sensitivity; professional biologist or hydrologist performs survey or provides oversight and training	375
4	Assessment of habitat based on quantitative measurements of instream parameters, channel morphology, and floodplain characteristics; conducted with bioassessment; data on land use compiled and used to supplement assessment; reference condition used as a basis for assessment	Assessment during 1-2 seasons; spatial coverage usually broad and commensurate with biological sampling; assessment may be regional or site-specific	High precision and sensitivity; professional biologist or hydrologist performs survey and assessment	380

NOTE: Table is based on use in lotic systems. With some modification, these approaches would apply to other waterbody types.

[a] Level of information refers to rigor of habitat assessment, where 1 = lowest and 4 = highest.

[b] Refers to ability of the habitat endpoints to detect impairment or to differentiate along a gradient of environmental conditions.

[c] WBS Assessment Type Codes from Table 1-1.

Table 3-3. Hierarchy of Toxicological Approaches and Levels for Evaluation of Aquatic Life Use Attainment

Level of Info[a]	Technical Components	Spatial/ Temporal Coverage	Data Quality[b]	WBS Codes[c]
1	Any one of the following: • Acute or chronic WET • Acute ambient • Acute sediment	1-2 WET tests/yr or 1 ambient or sediment sample tested in a segment or site	Unknown/low; minimal replication used; laboratory quality or expertise unknown	510, 520, 530, 550
2	Any of the following: • Acute or chronic ambient • Acute sediment • Acute and chronic WET for effluent-dominated system	3-4 WET tests/yr or 2 ambient or sediment samples tested in a segment or site at different times	Low/moderate—little replication used within a site; laboratory quality or expertise unknown or low	510, 520, 530, 540, 550
3	Any of the following: • Acute and chronic WET for effluent-dominated system • Chronic ambient or acute or chronic sediment	Monthly WET tests or total of 3 tests based on samples collected in a segment at 3 different times	Moderate/high—replication used; trained personnel and good laboratory quality	510, 520, 540, 550
4	Both of the following: • Acute and chronic ambient and • Acute or chronic sediment	≥ 4 tests in total based on samples collected in a segment at 4 different times including low flow conditions	High—replication used; trained personnel and good laboratory quality	530, 540, 550

[a] Level of information refers to rigor of toxicity testing, where 1 = lowest and 4 = highest

[b] Refers to ability of the toxicity testing endpoints to detect impairment or to differentiate along a gradient of environmental conditions

[c] WBS Assessment Type Codes from Table 1-1.

Table 3-4. Hierarchy of Physical/chemical Data Levels for Evaluation of Aquatic Life Use Attainment

Level of Info[a]	Technical Components	Spatial/Temporal Coverage	Data Quality[c]	WBS Codes[d]
1	Any one of the following: • Water quality monitoring using grab water sampling • Water data extrapolated from an upstream or downstream station where homogeneous conditions are expected • Monitoring data >5 years old without further validation • Best professional judgment based on land use data, source locations	Low spatial and temporal coverage: • Quarterly or less frequent sampling with limited period of record (e.g., 1 day) • Limited data during key periods or at high or low flows (critical hydrological regimes)[b].	Unknown/ Low	210, 220, 230, 240, 850, 150, 130
2	Any one of the following: • Water quality monitoring using grab water sampling • Rotating basin surveys involving multiple visits or automatic sampling • Synthesis of existing or historical information on fish contamination levels • Screening models based on loadings data (not calibrated or verified).	Moderate spatial and temporal coverage: • Bimonthly or quarterly sampling during key periods (e.g., spring/ summer months • Fish spawning seasons, including limited water quality data at high and low flows • Short period of record over a period of days or multiple visits during a year or season.	Low/ Moderate	210, 220, 222, 230, 240, 242, 260, 810, 180
3	Any one of the following: • Composite or a series of grab water sampling used (diurnal coverage as appropriate) • Calibrated models (calibration data <5 years old).	Broad spatial and temporal (long-term, e.g., > 3 years) coverage of site with sufficient frequency and coverage to capture acute events: • Typically, monthly sampling during key periods (e.g., spring/ summer months, fish spawning seasons), multiple samples at high and low flows • Lengthy period of record (sampling over a period of months).	Moderate/ High	211, 222, 242, 250, 610
4	All of the following: • Water quality monitoring using composite or series or grab samples (diurnal coverage as appropriate) • Limited sediment quality sampling and fish tissue analyses at sites with high probability of contamination.	Broad spatial (several sites) and temporal (long-term, e.g., > 3 years) coverage of site with sufficient frequency and parametric coverage to capture acute events, chronic conditions, and all other potential P/C impacts • Monthly sampling during key periods (e.g., spring/summer months • Fish spawning seasons) including multiple samples at high and low flows • Continuous monitoring.	High	231, 242, 250

NOTE: Physical refers to physical water parameters (e.g., temperature, pH, dissolved oxygen, turbidity, color, conductivity)

[a] Level of information refers to rigor of physical/chemical sampling and analysis, where 1 = lowest and 4 = highest.

[b] Even a short period of record can indicate a high confidence of *impairment* based on P/C data; 3 years of data are not required to demonstrate impairment. For example, a single visit to a stream with severe acid mine drainage impacts (high metals, low pH) can result in high confidence of nonsupport. However, long-term monitoring may be needed to establish full support.

[c] Refers to ability of the physical/chemical endpoints to detect impairment or to differentiate along a gradient of environmental conditions.

[d] WBS Assessment Type Codes from Table 1-1.

At the Workgroup's recommendation, EPA is applying levels of information to wadable streams and rivers where EPA's Rapid Bioassessment Protocols or other comparable methods can be applied. This is because, at this time, monitoring methods for wadable streams and rivers are better documented and standardized (Gibson et al. 1996, Plafkin et al., 1989) than for other surface water resources such as lakes and estuaries.

EPA asks States to document the level of information that characterizes their methods for biological, habitat, toxicological, and chemical evaluations. The approach may be extended to ALUS determinations in other types of waterbodies as well as other designated uses in future 305(b) cycles based on the experience with ALUS in streams and rivers and as methods for other waterbody types are standardized. The Waterbody System will contain fields to track level of information for each data type (first columns of Tables 3-1 through 3-4).

EPA encourages States to store and provide this information for each river and stream assessment in addition to WBS Assessment Type Codes. See Section 6, especially Table 6-1, of the main *Guidelines* volume regarding data elements for annual electronic reporting.

3.2.1 Bioassessment

Biological survey methods are desirable for ALUS determinations, because they measure ecosystem health and integrity more directly than surrogate techniques and serve as response indicators to a variety of stressors. Certain biological survey and assessment techniques are useful for screening; i.e., they are intended to be sufficient for detecting problems and may not be as rigorous as techniques used to assess the degree of use support or prioritize sites for further study or some mitigation action. However, simple biological screening techniques are usually sufficient to identify severely degraded or the other extreme (i.e., excellent) biological conditions. A hierarchy of biological approaches can be developed that incorporates certain technical considerations and are relevant to various levels of information (Table 3-1). The data quality elements emphasize a determination of precision (i.e., measurement error at a site as evidenced by the reproducibility of metric values or bioassessment scores for a given site during the same index period) and sensitivity (i.e., the ability to detect impairment relative to the reference condition).

Based on considerable information already available, EPA strongly endorses the regional reference approach for State bioassessment programs for streams (Gibson et al. 1996), which is a level 3 or 4 assessment in Table 3-1. If States choose not to implement a reference site approach, they are still encouraged to monitor two organism assemblages (level 4), with detailed taxonomy, a multimetric approach, and habitat evaluation. In calling for two assemblages, EPA seeks to include critical groups in the food chain that may react to different ecosystem stressors or differently to the same stressor. EPA recognizes that the use of two assemblages or the regional reference approach may not be feasible in certain cases (e.g., streams in the arid west due to naturally occurring conditions such as extreme temperatures and lack of flow). EPA also recognizes that some State bioassessment programs are in their early stages and may not yet have the capability to use a regional reference site approach or to monitor more than one assemblage.

Many States (Davis et al. 1996) are currently assessing a single assemblage, benthic macroinvertebrates, with detailed taxonomy, a multimetric approach, and habitat evaluation (Level 2 or 3 assessment in Table 3-1). These States are monitoring a critical assemblage that often gives the greatest information about ecosystem health for the available resources. For fish sampling, some rely on their fish and game agencies, which are mainly oriented to game fish. As resources permit, EPA encourages State water quality agencies to develop the capability for fish assemblage monitoring themselves or work with the fish and game staff to develop the needed capabilities.

<u>ALUS Determination Based on Biological Assessment Data</u>

A. Fully Supporting: Reliable data indicate functioning, sustainable biological assemblages (e.g., fish, macroinvertebrates, or algae) none of which has been modified significantly beyond the natural range of the reference condition.

B. Partially Supporting: At least one assemblage (e.g., fish, macroinvertebrates, or algae) indicates moderate modification of the biological community compared to the reference condition.

C. Not Supporting: At least one assemblage indicates nonsupport. Data clearly indicate severe modification of the biological community compared to the reference condition.

The interpretation of the terms "modified significantly," "moderate modification," and "severe modification" is State-specific and depends on the State's monitoring and water quality standards programs. For example, Ohio EPA reports nonattainment (not supporting) if none of its 3 indices (2 for fish and 1 for macroinvertebrates) meet ecoregion criteria or if one assemblage indicates severe toxic impact (Ohio's poor or very poor category), even if the other assemblage indicates attainment. Partial support exists if 1 of 2 or 2 of 3 indices do not meet ecoregion criteria and are in the poor or very poor category.

Additional Considerations for Lakes

State lake managers should address more than one biological assemblage in making lake ALUS decisions. Many parameters of these assemblages may not have specific criteria (e.g., algal blooms, growth of nuisance weeds) but have important effects on lake uses. Many are also response indicators of the level of lake eutrophication.

Lake resources vary regionally, even within States, due to variations in geology, vegetation, hydrology, and land use. Therefore, regional patterns of lake water quality, morphometry (physical characteristics such as size, shape, and depth), and watershed characteristics should ideally be defined based on comparison to natural conditions using an ecoregion approach. The State can then set reasonable goals and criteria for a variety of parameters. These regional patterns currently apply to natural lakes, but are being evaluated for use with reservoirs.

EPA is developing guidance on bioassessment protocols and biological criteria development for lakes and reservoirs (*Guidance on Lake and Reservoir Bioassessment and Biocriteria*, draft, U.S. EPA, 1996). Draft guidance is currently being revised to address a review of comments by EPA's Science Advisory Board. Notice of availability for public review and comment in the *Federal Register* is planned for 1997.

3.2.2. Habitat Assessment

Assessment of the physical habitat structure is necessary for aquatic life support evaluations because the condition and/or potential of the biological community is dependent upon supportive habitat. Aquatic fauna often have very specific habitat requirements, independent of water quality (Barbour et al. 1996a). The technique of habitat assessment has evolved substantially over the last decade to provide adequate information on the quality of the habitat. Numerous State and Tribal agencies are well-versed in habitat assessment and have incorporated appropriate techniques into their monitoring programs. Results from nonpoint-source assessments suggest that habitat alteration is a major source of perturbation of the Nation's surface waters. The strengths of habitat assessment are: (1) enhances interpretation of biological data; (2) provides information on non-chemical stressors, and (3) leads to informed decisions regarding problem identification and restoration.

Most often, habitat assessment is conducted in conjunction with bioassessment. A general habitat assessment incorporates physical attributes from microhabitat features such as substrate, velocity, depth, to channel morphology features such as width, sinuosity, flow or volume, to riparian and bank structure features. All of these features are stressor indicators. The approach also can integrate habitat information into an index or summary of overall habitat condition.

The rigor of the habitat assessment ranges from a visual-based characterization (Level 1), which documents specific characteristics without placing a value, to a true assessment (Levels 2 through 4), which places a value on the quality of the physical habitat structure (Table 3-2). Habitat assessments may be visual-based (e.g., RBPs), patterned after Ohio EPA (1987), Plafkin et al. (1989), Florida DEP (1994), and Idaho DEQ (1995), or more quantitative as suggested by the Environmental Monitoring and Assessment Program (EMAP). The data quality associated with habitat assessment is more difficult to define than with bioassessment, but can be done by a comparison among investigators.

ALUS Determination Based on Habitat Assessment Data.

A. Fully Supporting: Reliable data indicate natural channel morphology, substrate composition, bank/riparian structure, and flow regime of region. Riparian vegetation of natural types and of relatively full standing crop biomass (i.e., minimal grazing or disruptive pressure).

B. Partially Supporting: Modification of habitat slight to moderate usually due to road crossings, limited riparian zones because of encroaching land use patterns, and some watershed erosion. Channel modification slight to moderate.

C. Not Supporting: Moderate to severe habitat alteration by channelization and dredging activities, removal of riparian vegetation, bank failure, heavy watershed erosion or alteration of flow regime.

Habitat assessment is mostly conducted in conjunction with bioassessment. However, degradation of habitat associated with aquatic resources is a primary stressor limiting the attainment of aquatic life use support in many regions of the country. Land use patterns involving urban development and impervious surface, agriculture and ranching, silviculture, mining, and flood control/regulation are generally the principal factors in habitat degradation.

3.2.3. Aquatic and Sediment Toxicity Methods

EPA recommends that information from toxicity tests be separated from the physical/chemical data. Although chemical criteria are based on toxicity tests, actual testing done to evaluate an aquatic life use should be treated as an additional ecological indicator.

Toxicity tests are a well-established tool for examining effects of both point and nonpoint sources of chemicals or effluents in surface waters (i.e., stressor and exposure indicators). Most States require whole effluent toxicity (WET) testing of waste water dischargers under the NPDES program. For ALUS, ambient water column and whole sediment toxicity tests may be most relevant, particularly if the early life stages of test organisms and sublethal (chronic) endpoints are used (Table 3-3). Ambient tests use samples that are collected from sites and that are typically used whole (i.e., no dilution). Toxicity tests, like chemical analyses, use temporally discrete samples which, in the case of water column tests, typically have short holding times (< 36 hours according to EPA guidance). Sediment samples may be held for longer periods (2 to 8 weeks) prior to testing if stored properly. Samples used in aquatic toxicity testing are usually collected over no more than a 24-hour period. Sediment samples, by their very nature, are grab samples which are also collected over a short time period (hours) at any one site. As a result, all toxicity tests, even those involving prolonged chronic exposures (such as EPA 7-day chronic tests or 28-day chronic sediment tests), yield data that are a "snapshot" in time. The longer the period of time over which site water or sediment samples are collected and used in testing, the longer the "snapshot" and the higher confidence that the test result is representative of prevailing water or sediment quality conditions at that time. The strengths of ambient toxicity tests are:

- They aid in identifying point and nonpoint source water-quality impairments that may otherwise be undetectable using other monitoring tools;
- They are used for confirming that observed impairment is not due to chemical or toxicity-related sources. Ohio EPA and the North Carolina Division of Water Quality, for example, used toxicity tests to demonstrate that habitat or physical stressors were the major causes of impairment in some systems and not point-source toxicity as previously assumed;
- They integrate biological effects of most chemical stressors present, thereby giving a more accurate estimate of the actual water or sediment quality as compared to chemical concentration measurements; this has been shown to be particularly true for certain water column metals, bulk sediment chemical measurements that do not take into account total organic carbon or acid volatile sulfide concentrations (for nonpolar organics and metals, respectively), and for sites in which potential pollutants were unmeasured or unknown.

WET tests are potentially useful for ALUS at sites in which an effluent contributes the major flow instream (i.e., effluent-dominated or effluent-dependent systems). These tests are well standardized and relatively easy to interpret, however, their relationship to ALUS is dependent on many factors that may or may not be identifiable for the system of interest (Waller et al. 1996; LaPoint et al. 1996).

Sediment toxicity tests are especially useful for ALUS since sediments can be prominent sources as well as sinks. For this reason, sediment samples may represent a somewhat longer "snapshot" in time than water column samples. Also, because sediment samples can be stored for longer periods than water samples, they are more convenient to use in testing. Collection of sediment pore water or elutriates further enhances the use of sediments in ALUS because these fractions may contain most of the bioavailable pollutants present and because these fractions are amenable to standard aquatic toxicity test methods. Combined with bioassessments and sediment chemical analyses, sediment toxicity is a powerful tool to evaluate and identify causes of impairment. Whole sediment testing, using the more standardized 10-day acute tests, may be most appropriate for ALUS. These are the least labor-intensive and costly tests and are also easiest to interpret. The more recently developed EPA chronic sediment test methods (which should be available by the end of 1997) are also promising tools for ALUS. Sediment testing is most relevant if there are appropriate reference site sediments available with which to compare different site samples. Usually, such reference sites are available, but in some instances are defined by trial and error. The use of clean laboratory-formulated reference sediments as a means of comparison is also a viable option, particularly if factors such as sediment particle size are similar to that observed at the site of interest.

Concerns with sediment tests are: (1) for representativeness, many sediment samples may need to be composited at a site to overcome physical and chemical heterogeneity; (2) storage and manipulation of samples prior to testing may change the chemical characteristics and toxicity of a sample in unknown ways; and (3) for some species, physical characteristics of the sediment (e.g., particle size or TOC) may be suboptimal for the test species resulting in a false positive or apparently toxic conditions when there are none. This may necessitate the use of two or more different test species for a given sediment sample.

Several EPA, American Society for Testing Materials (ASTM), and State agency toxicity test methods exist, both for saltwater and freshwater aquatic and sediment toxicity tests, ranging from short-term acute or lethality tests (usually 48 to 96h in length for aquatic and pore water or elutriate tests and 10d for whole sediments) to longer term early life stage

(7 day for pore water and elutriates and 28 day for whole sediments) and full life-cycle (> 21 day for aquatic tests) chronic tests that measure sublethal endpoints. Some sublethal tests such as those for saltwater bivalve embryo-larval development or echinoderm fertilization, may be much shorter in duration (48 and 1.5 hour, respectively). Appropriate sample collection is critical to ensure representative and accurate results. In addition, chemically inert sampling equipment must be used and depth and/or width integrated composite samples should be considered for ALUS determination.

ALUS Determinations Based on Aquatic and/or Sediment Toxicity Data

A. Fully Supporting: No toxicity noted in either acute or chronic tests compared to controls or reference conditions.

B. Partially Supporting: No toxicity noted in acute tests, but may be present in chronic tests in either slight amounts and/or infrequently within an annual cycle.

C. Not Supporting: Toxicity noted in many tests and occurs frequently.

Other Considerations

For certain species such as planktonic ones, ambient aquatic samples may appear more or less toxic due to the presence of certain natural water quality conditions or eutrophication effects. Ambient tests are a "snapshot" in time and may be unrepresentative of other times, seasons, or flows. Non-toxic conditions include naturally high dissolved solids, hardness, or conductivity, or naturally low alkalinity and hardness. Appropriate reference site or control samples for comparison may not be readily available in some systems resulting in a certain amount of uncertainty in extrapolating laboratory control or simulated reference conditions to actual natural conditions at a site. WET tests are best incorporated into the NPDES program; for ALUS, the results obtained using tools in the 305(b) process such as bioassessment, ambient aquatic and sediment toxicity tests, and chemical monitoring are more appropriate.

3.2.4 Physical/Chemical Methods

The use of physical/chemical data as stressor and exposure indicators for determining ALUS has long been a basis of State monitoring programs. Established criteria exist for many chemical parameters and standard sampling and analysis protocols have been developed for ensuring consistency and quality control. These data are separated into categories of toxicants (priority pollutants, chlorine, and ammonia), conventionals (dissolved oxygen, pH, temperature) in reference to the physical constituents of water quality, and metals. Although SOPs exist for physical/chemical parameters, States still differ in their design and implementation of chemical sampling and analysis (Table 3-4). Sampling frequency and intensity vary among states. The number of parameters sampled and analyzed also varies among programs which influences comparability in assessments.

Analyses of chemical concentrations in fish tissues are included in Table 3-4. Though not a traditional or required measure of ALUS, fish tissue concentrations are useful for evaluating the potential impacts to wildlife that depend on aquatic systems for food and/or habitat.

ALUS Determinations Based on Physical/Chemical Assessment Data

EPA recognizes that many States may not always collect a broad spectrum of chemical data for every waterbody. Therefore, States are expected to apply the following guidance to whatever data are available and to use a "worst case" approach where multiple types of data are available. If, for example, chemical data indicate full support but temperature data indicate impairment, the waterbody is considered impaired.

Conventionals (dissolved oxygen, pH, temperature)

A. Fully Supporting: For any one pollutant or stressor, criteria exceeded in $\leq$10 percent of measurements. In the case of dissolved oxygen (DO), national ambient water quality criteria specify the recommended acceptable daily average and 7-day average minimums and the acceptable 7-day and 30-day averages. States should document the DO criteria being used for the assessment and should discuss any biases that may be introduced by the sampling program (e.g., grab sampling in waterbodies with considerable diurnal variation).

B. Partially Supporting: For any one pollutant, criteria exceeded in 11 to 25 percent of measurements. For DO, the above considerations apply.

C. Not Supporting: For any one pollutant, criteria exceeded in >25 percent of measurements. For DO, the above considerations apply.

Special Considerations for Lakes

For lakes, States should discuss their interpretation of DO, pH, and temperature standards for both epilimnetic and hypolimnetic waters. In addition, States should consider turbidity and lake bottom siltation.

Toxicants (priority pollutants, metals, chlorine, and ammonia)

A. Fully Supporting: For any one pollutant, no more than 1 exceedance of acute criteria (EPA's criteria maximum concentration or applicable State/Tribal criteria) within a 3-year period based on grab or composite samples and no more than 1 exceedance of chronic criteria (EPA's criteria continuous concentration or applicable State/Tribal criteria) within a 3-year period based on grab or composite samples.

B. Partially Supporting: For any one pollutant, acute or chronic criteria exceeded more than once within a 3-year period, but in $\leq$10 percent of samples.

C. Not Supporting: For any one pollutant, acute or chronic criteria exceeded in >10 percent of samples.

Note: The above assumes at least 10 samples over a 3-year period. If fewer than 10 samples are available, the State should use discretion and consider other factors such as the number of pollutants having a single violation and the magnitude of the exceedance(s).

Other Considerations Regarding Toxicant Data

- EPA maintains that chronic criteria should be met in a waterbody that fully supports its uses. Few States and Tribes, if any, are obtaining composite data over a 4-day sampling period for comparison to chronic criteria. EPA believes that 4-day composites are not an absolute requirement for evaluating whether chronic criteria are being met. Grab and composite samples (including 1-day composites) can be used in water quality assessments if taken during stable conditions. This should give States more flexibility in utilizing chronic criteria for assessments.

- States should document their sampling frequency. Sampling frequency should be based on potential variability in toxicant concentrations. In general, waters should have at least quarterly data to be considered monitored; monthly or more frequent data are considered abundant. More than 3 years of data may be used, although the once-in-3-years consideration still applies (i.e., two violations are allowed in 6 years of abundant data).

- The once-in-3-years goal is not intended to include spurious violations resulting from lack of precision in analytical tests. Therefore, using documented quality assurance/quality control (QA/QC) assessments, States may consider the effect of laboratory imprecision on the observed frequency of violations.

- If the duration and frequency specifications of EPA criteria change in the future, these recommendations should be changed accordingly.

- Samples should be taken outside of designated mixing zones or zones of initial dilution.

Special Considerations Regarding Metals

The implementation and application of metals criteria is complex due to the site-specific nature of metals toxicity. EPA's policy is for States to adopt and use the dissolved metal fraction to set and measure compliance with water quality standards, because dissolved metal more closely approximates the bioavailable fraction of metal in the water column than does total recoverable metal. One reason is that a primary mechanism for water column toxicity is adsorption at the gill surface which requires metals to be in the dissolved form. Table 3-5 provides guidance for calculating EPA dissolved criteria from the published total recoverable criteria. The dissolved metal criteria, expressed as percentage, are presented as recommended values and ranges. If a State is collecting dissolved metal data but does not yet have dissolved criteria, Table 3-5 might be useful for estimating screening values. Also, if total recoverable metal concentrations are less than the estimated dissolved metal criteria calculated from Table 3-5, the State could be relatively certain that toxic concentrations are not present.

Some States have already developed and are using dissolved metals criteria and should continue to do so. In the absence of dissolved metals data and State criteria, States should continue to apply total recoverable metals criteria to total recoverable metals data because this is more conservative and thus protective of aquatic life. In some situations, a State may choose to use total recoverable metals criteria when there are indications that total metal loadings could be a stress to the ecosystem. The ambient water quality criteria are neither designed nor intended to address the fate and effect of metals in an ecosystem, e.g., protect sediments, prevent effects due to food webs containing organisms that dwell in the sediments and those that dwell in the water column and filter or ingest suspended particles. However, since consideration of sediments or bioaccumulative impacts is not incorporated into the criteria methodology, the appropriateness and degree of conservatism inherent in the total recoverable approach is unknown.

Historical metals data should be used with care. Concern about the reliability of the data are greatest below about 5 to 10 ppb due to the possibility of contamination problems during sample collection and analysis. EPA believes that most historical metals concentrations above this level are valid if collected with appropriate quality assurance and quality control.

Table 3-5. Recommended Factors for Converting Total Recoverable Metal Criteria to Dissolved Metal Criteria

Metal	Recommended Conversion Factors	
	CMC[a]	CCC[a]
Arsenic (III)	1.000	1.000
Cadmium[b]		
Hardness = 50 mg/L	0.973	0.938
Hardness = 100 mg/L	0.944	0.909
Hardness = 200 mg/L	0.915	0.880
Chromium (III)	0.316	0.860[c]
Chromium (VI)	0.982	0.962
Copper	0.960	0.960
Lead[b]		
Hardness = 50 mg/L	0.892	0.892
Hardness = 100 mg/L	0.791	0.791
Hardness = 200 mg/L	0.690	0.690
Nickel	0.998	0.997
Selenium	0.922	0.922
Zinc	0.978	0.986

[a] CMC = Criterion Maximum Concentration
CCC = Criterion Continuous Concentration

[b] The recommended conversion factors (CFs) for any hardness can be calculated using the following equations:

Cadmium
CMC: CF = 1.136672 - [(ln hardness) (0.041838)]
CCC: CF = 1.101672 - [(ln hardness) (0.041838)]

Lead (CMC and CCC): CF = 1.46203 - [(ln hardness) (0.145712)]

where:
(ln hardness) = natural logarithm of the hardness. The recommended CFs are given to three decimal places because they are intermediate values in the calculation of dissolved criteria.

[c] This CF applies only if the CCC is based on the test by Stevens and Chapman (1984). If the CCC is based on other chronic tests, it is likely that the CF should be 0.590, 0.376, or the average of these two values.

Source: Stephen, C. E. 1995. *Derivation of Conversion Factors for the Calculation of Dissolved Freshwater Aquatic Life Criteria for Metals*. U.S. EPA, Environmental Research Laboratory, Duluth.

3.2.5 Integration of Different Data Types in Making an ALUS Determination

The following guidelines apply to ALUS determinations for wadable streams and rivers when biological, habitat, chemical, and/or toxicity data types are available (Figure 3-2, Table 3-6). These guidelines strongly emphasize the use of biological data for the assessment of ALUS specific to wadeable streams and rivers. However, the basic principles are applicable to other waterbody types. This guidance has undergone external peer-review (Dickson et al. 1996) and has been revised to address the principle peer-review recommendations to improve the guidance. In addition, peer review recommendations were made to expand the guidance to (1) develop a confidence icon for the overall assessment and (2) develop guidelines that consider the results from biological, chemical and physical assessments in relation to their role as response, stressor or exposure indicators. The peer review specifically recommended that EPA develop a weighting algorithm for biological results (as response indicator) in relation to results from physical/chemical, habitat, and toxicological assessments (as stressor/exposure indicators). These latter recommendations will be evaluated for future guidelines. EPA considers the current guidelines, particularly consideration of level of information, as providing the initial basis for addressing these additional peer review recommendations.

EPA recommends consideration of the level of information of the different data types in evaluating degree of impairment (partial support vs nonsupport). Case studies follow that demonstrate how ALUS determinations could be made based on types of data, level of information, and site specific information and conditions, and are not intended to cover all possible situations but to highlight commonly encountered scenarios. These case studies are based on actual State examples that represent a State's decision process in making an ALUS determination, and are presented in a uniform manner for illustration. Different states use different ordinal scales for assessment.

Generally, assessments based on data with high levels of information should be weighted more heavily than those based on data with low levels of information, and biological data should be weighted more heavily than other data types. In particular, it is recommended that the results of biological assessments, especially those with high levels of information, be the basis for the overall ALUS determination if the data indicate impairment. This is because the biological data provide a direct measure of the status of the aquatic biota and detect the cumulative impact of multiple stressors on the aquatic community, including new or previously undetected stressors. This approach is consistent with EPA's Policy on Independent Application while incorporating a weight of evidence approach in determining the degree of impairment (partial or nonsupport). The Policy does not allow for a

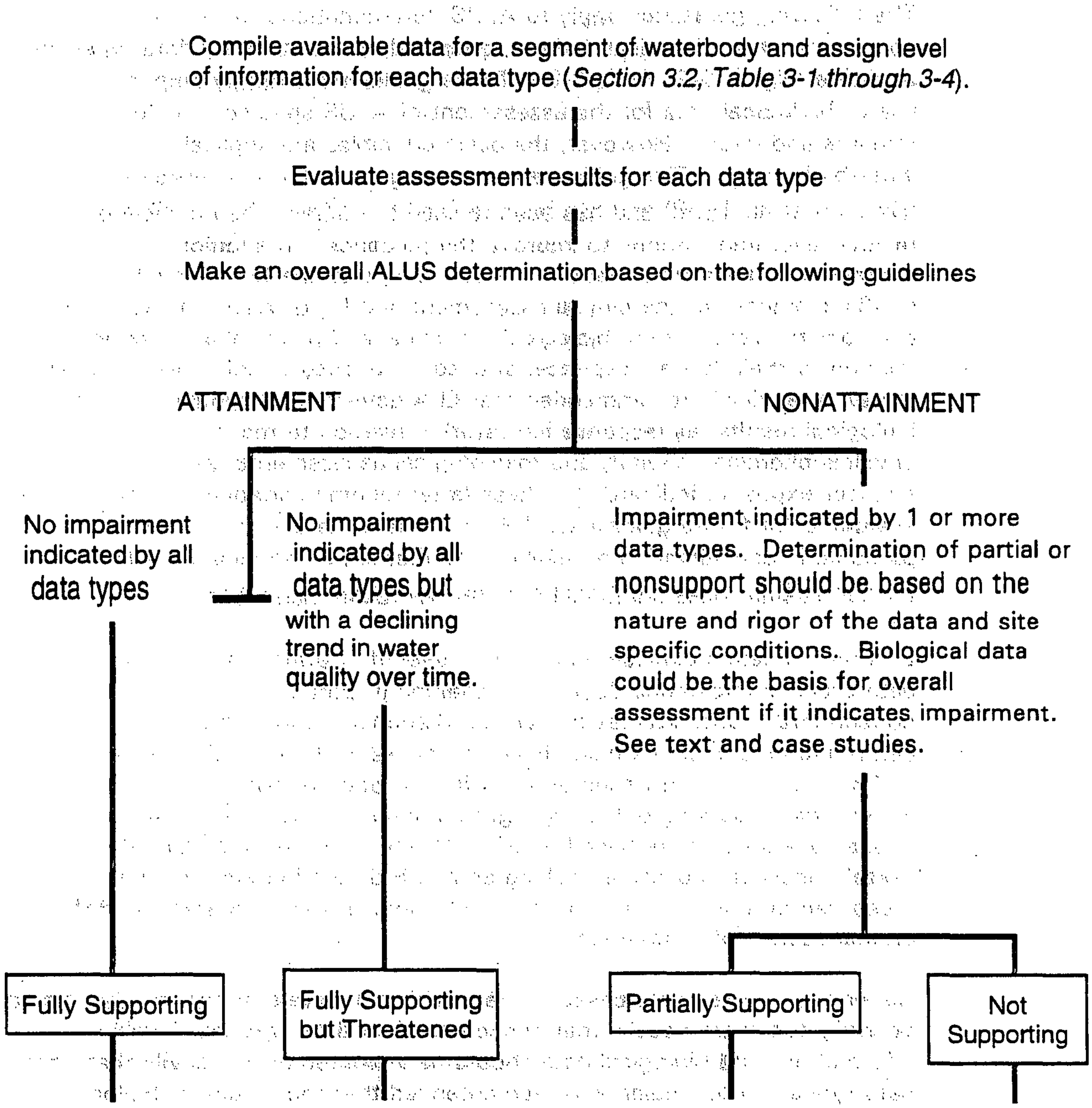


Figure 3-2. Determination of ALUS using biological, chemical, toxicological, and/or habitat data.

Table 3-6. Determination of ALUS Using More Than One Data Type

ALUS Attainment	
A. Fully Supporting:	No impairment indicated by all data types
B. Fully Supporting but Threatened:	No impairment indicated by all data types; one or more categories indicate an apparent decline in ecological quality over time or potential water quality problems requiring additional data or verification, or Other information suggests a threatened determination (see Section 3.2)
ALUS Non-attainment	
C. *Partially Supporting:	Impairment indicated by one or more data types and no impairment indicated by others.
D. *Not Supporting:	Impairment indicated by all data types

* A determination of *partially supporting* or *not supporting* could be made based on the nature and rigor of the data and site-specific conditions in the results of the data types. If bioassessment (usually Level 3 or 4) indicates impairment, then a determination of not supporting should be made. See case studies that follow.

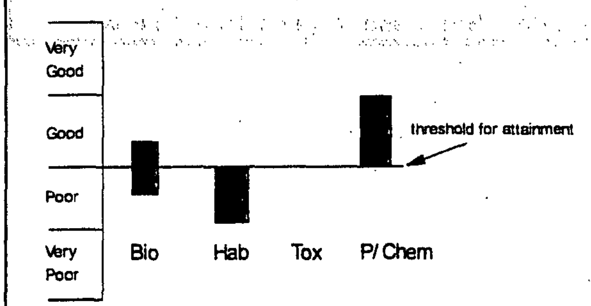
Ten Mile River, MA-Site TM01 Dec. 1991

Waterbody Description
ALUS: Class B, warm water fishery Reach Size: 0.8 miles, Headwaters to Bacon Street, Plainville, site upstream of electroplating facility Drainage Area: ? Stressors: urban development, impoundment Number of sites monitored: 1

Assessment Quality

Data Type	Level 1	2	3	4	Description
Biological			✓		• RBP (Benthic and Fish) survey, 1990
Habitat			✓		• Vis.-based RBP
Toxicity					• None
P/Chemical		✓			• Conventionals, no metals

Assessment Findings



Results Summary:

a. Benthos show some impairment, but fish indicate no impairment
b. Habitat is degraded from impoundments and urban development
c. Analysis of conventional pollutants shows no exceedances

Result = Partially Supporting

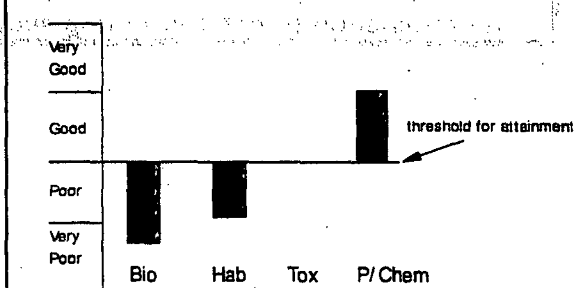
Ten Mile River, MA-Site TM02 Dec. 1991

Waterbody Description
ALUS: Class B, warm water fishery Reach Size: 0.1 miles, Bacon Street, Plainville, site downstream of electroplating facility Drainage Area: ? Stressors: urban development, impoundment Number of sites monitored: 1

Assessment Quality

Data Type	Level 1	2	3	4	Description
Biological			✓		• RBP (Benthic and Fish) survey, 1990
Habitat			✓		• Vis.-based RBP
Toxicity					• None
P/Chemical		✓			• Conventionals, no metals

Assessment Findings



Results Summary:

a. Both benthos and fish show impairment
b. Habitat is degraded from impoundments and urban development
c. Analysis of conventional pollutants shows no exceedances

Result = Not Supporting

Little River, Kentucky, 1994-95

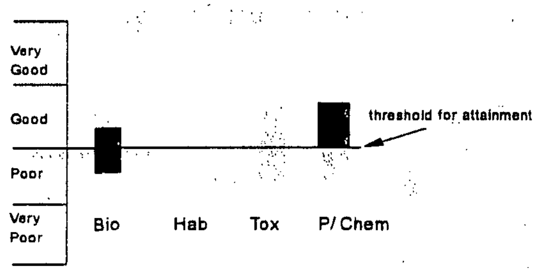
Waterbody Description

ALUS: Warmwater Aquatic Life
Reach Size: 37.4 mi
Drainage Area: 250 mi²
Stressors: Municipal WWTPs, agriculture
Number of sites monitored: 1

Assessment Quality

Data Type	Level 1	2	3	4	Description
• Biological	✓			✓	• Fish, macroinvertebrates (Level 4), algae survey by division biologists; survey form submitted by regional fisheries biologiest
• Habitat					
• Toxicity					
• P/Chemical			✓		• Monthly ambient monitoring network station

Assessment Findings



Results Summary:

a. Analysis of conventional pollutants and metals show no results greater than water quality criteria
b. Biological assessment of 3 assemblages indicates only partial use support, mostly from macroinvertebrate data
c. Survey of district fisheries biologist indicates fair fishery

Result = Partially Supporting

Middle Fork Kentucky River, Kentucky, 1995

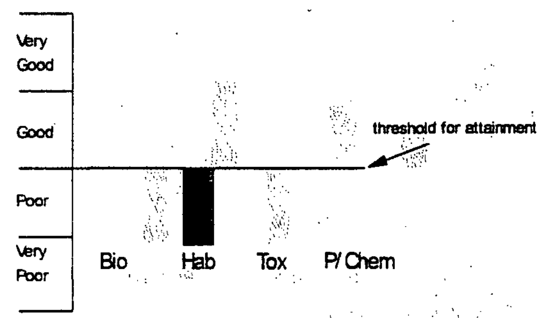
Waterbody Description

ALUS: Warmwater Aquatic Life
Reach Size: 27.1 mi
Drainage Area: 205 mi²
Stressors: Coal mining
Number of sites monitored: None; assessment is visual observation and general knowledge of qualify of fishery

Assessment Quality

Data Type	Level 1	2	3	4	Description
• Biological					
• Habitat	✓				• Survey submitted by regional fisheries biologies
• Toxicity					
• P/Chemical					

Assessment Findings



Results Summary:

a. Fisheries biologist familiar with this river indicates poor fishery because of heavy siltation from surface mining smothering the cobble substrate

Result = Not Supporting

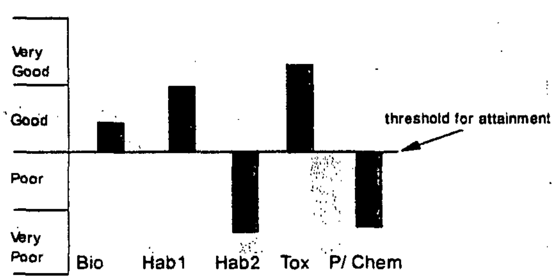
Blackstone River, MS 62-06, Massachusetts, 1994

Waterbody Description
ALUS: Class B, Warmwater Fishery Reach Size: 3.7 mi Drainage Area: ? Stressors: WWTP treating industrial center of Blackstone; urban runoff; contaminated sediments Number of sites monitored: 1

Assessment Quality

Data Type	Level 1	2	3	4	Description
•Biological			✓		• RBP (Benthic) Survey
•Habitat			✓		• Visual-based done at 2 sites
•Toxicity		✓			• Instream chronic test
•P/Chemical		✓			• Toxics (water column and sediments

Assessment Findings



Results Summary:

a. Benthic assemblage diverse, but dominated by relatively tolerant taxa
b. Habitat good at site 1, but water withdrawal causes stream to go dry at 2.
c. No instream chronic toxicity
d. Cd, Cu, Pb exceed chronic criteria; Cu also exceeds acute criterion

Result = Partially Supporting

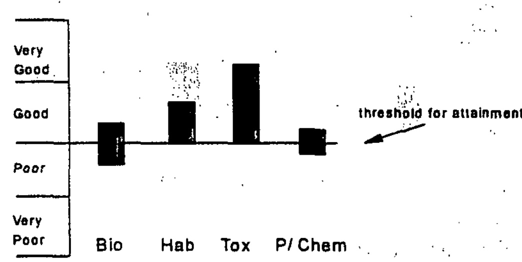
Naugatuck River CT 6900, Connecticut, 1996

Waterbody Description
ALUS: Fish and Wildlife Habitat Reach Size: 19 miles Torrington to Waterbury Drainage Area: 155 mi² Stressors: 2 POTWS, 3 metal finishers, urban runoff Number of sites monitored: 4 biol., 1 chem., long term sites

Assessment Quality

Data Type	Level 1	2	3	4	Description
•Biological				✓	• RBP III Benthos • RBP IV Fish
•Habitat			✓		• RBP Visual obs.
•Toxicity	✓				• WET acute
•P/Chemical			✓		• Conventional, metals, longterm fish tissue

Assessment Findings



Results Summary:

a. Benthos show moderate impairment, fish show no impairment.
b. Habitat is fair to good.
c. Toxicity - WET testing indicates no exceedance.
d. Conventional pollutants show no exceedance, some exceedance of copper chronic criteria at low flows.

Result = Partially Supporting

determination of full support when there are differences in assessment results when at least one assessment indicates impairment. For example, it is possible to arrive at an overall assessment of partial support where biological data indicate full support and other data types indicate some level of impairment.

3.2.6 Additional Information on Biological Assessment of ALUS for Wadable Streams and Rivers

The following information may be useful to States in making ALUS determinations based on biological and associated habitat data. Biological assessments are evaluations of the biological condition of waterbodies using biological surveys and other direct measurements of resident biota in surface waters and comparing results to the established biological criteria. They are done by qualified professional staff trained in biological methods and data interpretation. The utility of biological measures has been demonstrated in assessing impairment of receiving waterbodies, particularly that caused by nonpoint sources and nontraditional water quality problems such as habitat degradation. Biological assessments are key to determining whether functional, sustainable communities are present and whether any of these communities have been modified beyond the natural range of the reference condition. Functional and sustainable implies that communities at each trophic level have species composition, population density, tolerance to stressors, and healthy individuals within the range of the reference condition and that the entire aquatic system is capable of maintaining its levels of diversity and natural processes in the future (see Angermeier and Karr, 1994).

The techniques for biosurveys are still evolving, but there have been significant improvements in the last decade. Appropriate methods have been established by EPA (e.g., Plafkin et al., 1989), State agencies (e.g., Ohio EPA, 1987; Massachusetts DEP, 1996; Florida DEP, 1994; Idaho DEQ, 1995), and other investigators assessing the condition of the biota (e.g., Karr et al., 1986). Guidance for development of biocriteria-based programs is provided in the *Biological Criteria: National Program Guidance for Surface Waters* (U.S. EPA, 1990) and *Biological Criteria: Technical Guidance for Streams and Small Rivers* (Gibson et al., 1996). As biosurvey techniques continue to improve, several technical considerations apply:

- *The identification of the REFERENCE CONDITION is basic to any assessment of impairment or attainment of aquatic life use and to the establishment of biological criteria.*

  Reference conditions are described from an aggregate of data best acquired from multiple sites with similar physical dimensions, represent minimally impaired conditions, and provide an estimate of natural variability in biological condition and habitat quality. For determining reference condition, alternative approaches to selection of reference sites include use of historical data, paleoecological data for lakes, experimental laboratory data for select cases, quantitative models, and best professional judgment (Hughes 1995).

Reference conditions must be stratified (i.e., put into homogenous waterbody classes) to account for much of the natural physical and climatic variability that affects the geographic distribution of biological communities. The Ecoregion Concept (Omernik, 1987) recognizes geographic patterns of similarity among ecosystems, grouped on the basis of environmental variables such as climate, soil type, physiography, and vegetation. Currently, efforts are under way in several parts of the country to refine these ecoregions into a more useful framework to classify waterbodies. Procedures have begun in several ecoregions and subecoregions to identify reference conditions within those particular units. In essence, these studies are developing reference databases to define biological potential and physical habitat expectations within ecoregions. The concept of reference conditions for bioassessment and biocriteria is discussed further below.

In developing community bioassessment protocols, reference conditions against which to compare test sites and to judge impairment are needed. Ideally, reference conditions represent the highest biological conditions found in waterbodies unimpacted by human pollution and disturbance. That is, the regional reference site concept is meant to accommodate natural variations in biological communities due to bedrock, soils, and other natural physicochemical differences. Recognizing that pristine habitats are rare (even remote lakes and streams are subject to atmospheric deposition), resource managers must decide on an acceptable level of disturbance to represent an achievable or existing reference condition. Acceptable reference conditions will differ among geographic regions and States and will depend on the aquatic life use designations incorporated into State water quality standards.

Characterization of reference conditions depends heavily on classification of natural resources. The purpose of a classification is to explain the natural biological condition of a natural resource from the physical characteristics. Waterbodies vary widely in size and ecological characteristics, and a single reference condition that applies to all systems would be misleading. A classification system that organizes waterbodies into groups with similar ecological characteristics is required to develop meaningful reference conditions.

The best approach to classifying and characterizing regional reference conditions is determined by the estimated quality of potential reference sites that are available in the region. If a sufficient number of relatively undisturbed waterbodies exist (e.g., primarily forested watersheds), then it is possible to define watershed conditions that are acceptable for reference sites. If no reference sites exist, then reference conditions can be characterized based on an extrapolation of the biological attributes representative of the aquatic biota expected to be found in the region (see Gibson et al., 1996) or through other quantitative models (Hughes 1995). EPA sees the use of a regional reference condition as an important component and goal of State biological programs. The Agency also recognizes that other approaches, such as upstream/downstream sampling, may be necessary (U.S. EPA, 1990).

The Ohio Environmental Protection Agency has been very active in the development of biocriteria based on reference conditions. Ohio's experiences and methods may be useful to other States in developing their biological monitoring and biocriteria programs (see, for example, Ohio EPA, 1987, 1990). Florida DEP has developed a similar approach for defining reference conditions (Barbour et al., 1996); Arizona DEQ has oriented its reference condition by elevation (Spindler, 1996); and Maine DEC uses a statistically derived-decision model technique that is based on a knowledge of the ecology and expectations in the response to perturbation of the biological attributes to classify and assess its streams (Davis et al., 1993). For further information on the development and implementation of biological criteria and assessments, States should consult *Biological Criteria: National Program Guidance for Surface Waters* (U.S. EPA, 1990), *Rapid Bioassessment Protocols for Use in Streams and Rivers: Benthic Macroinvertebrates and Fish* (Plafkin et al., 1989), and *Biological Criteria: Technical Guidance for Streams and Small Rivers* (Gibson et al., 1996).

- *A MULTIMETRIC APPROACH TO BIOASSESSMENT is recommended to strengthen data interpretation and reduce error in judgment based solely on population indices and measures.*

The accurate assessment of biological integrity requires a method that integrates biotic responses through an examination of patterns and processes from individual to ecosystem levels (Karr et al., 1986). The early conventional approach to using individual population measures has been to select some biological parameter that refers to a narrow range of changes or conditions and evaluate that parameter (e.g., species distributions, abundance trends, standing crop, or production estimates). Parameters are interpreted separately with a summary statement about the overall health. This approach is limited in that the key parameters emphasized may not be reflective of overall ecological health. The preferred approach is to define an array of metrics that individually provide information on each biological parameter and, when integrated, function as an overall indicator of biological condition. The strength of such a multimetric approach, when the component metrics are calibrated for a particular stream class, is its ability to integrate information from individual, population, assemblage, and zoogeographic levels into a single, ecologically-based index of water resource quality (Karr et al., 1986). The development of metrics for use in the biocriteria process can be partitioned into two phases (Barbour et al., 1995). First, an evaluation of candidate metrics is necessary to eliminate nonresponsive metrics and to address various technical issues (i.e., associated with methods, sampling habitat and frequency, etc.). Second, calibration of the metrics determines the discriminatory power of each metric and identifies thresholds for discriminating between "good" and"poor" sites. Known impaired sites are used to provide a test of discriminatory power. This process defines a suite of metrics that are optimal candidates for inclusion in bioassessments. Subsequently, a procedure for aggregating metrics to provide an integrative index is needed. For a metric to be useful, it must be (1) relevant to the biological community under study and to the specified program objectives; (2) sensitive to stressors; (3) able to provide a response that can be discriminated from natural variation; (4) environmentally benign to measure in the aquatic environment; and (5) cost-effective to sample. A number of metrics have been developed and subsequently tested in field surveys of benthic macroinvertebrate and fish assemblage (Barbour et al., 1995).

- *Assessment of HABITAT STRUCTURE as an element of the biosurvey is critical to assessment of biological response.*

Interpretation of biological data in the context of habitat quality provides a mechanism for discerning the effects of physical habitat structure on biota from those of chemical toxicants. If habitat is of poor or somewhat degraded condition, expected biological values are lowered; conversely, if habitat is in good condition (relative to regional expectations), high biological condition values are expected. Poor habitat structure will prevent the attainment of the expected biological condition, even as water quality problems are ameliorated. If lowered biological values are indicated simultaneously with good habitat assessment rating scores, toxic or conventional contaminants in the system may have caused a suppression of community development. Additional chemical data may be needed to further define the probable causes (stressors). On the other hand, high biological metric scores in poor habitat could indicate a temporary response to organic enrichment, natural variation in colonization/mortality, change in predation pressures, change in food source/abundance, or other factors.

- *A standardized INDEX PERIOD is important for consistent and effective monitoring.*

  The intent of a statewide bioassessment program is to evaluate overall biological conditions. The capacity of the aquatic community to reflect integrated environmental effects over time can be used as a foundation for developing bioassessment strategies (Plafkin et al., 1989). An index period is a time frame for sampling the condition of the community that is a cost-effective alternative to sampling on a year-round basis. Ideally, the optimal index period will correspond to recruitment cycles of the organisms (based on reproduction, emergence, and migration patterns). In some instances, an index period would be oriented to maximize impact of a particular pollutant source (e.g., high-temperature/low-flow period for point sources). Sampling during an index period can (1) minimize between-year variability due to natural events, (2) optimize accessibility of the target assemblages, and (3) maximize efficiency of sampling gear.

- *STANDARD OPERATING PROCEDURES and an effective QUALITY ASSURANCE PROGRAM are established to support the integrity of the data.*

  The validity of the ecological study and resultant conclusions are dependent upon an effective QA Plan. An effective QA Plan at the onset of a study provides guidance to staff in several areas: objectives and milestones for achieving objectives throughout the study; lines of responsibility; accountability of staff for data quality objectives; and accountability for ensuring precision, accuracy, completeness of data collection activities, and documentation of sample custody procedures. Documented SOPs for developing study plans, maintenance and application of field sampling gear, performance of laboratory activities, and data analyses are integral quality control components of QA that can provide significant control of potential error sources.

- *A determination of PERFORMANCE CHARACTERISTICS of the bioassessment provides an understanding of the data quality for the assessment.*

  Perhaps the most important component in making bioassessments useful to water resource programs is the data quality of different assessment methods currently in use and the level of comparability among methods in performing an assessment. The comparability of methods should be judged by the degree of similarity in their performance characteristics (i.e., a performance-based approach) rather than by direct comparison of their respective scores or metric values (ITFM 1995, Diamond et al. 1996). To enable a sharing of data and results from various techniques that might be used by different agencies or other groups, some level of confidence in making an assessment must be established for each method based on the quality of data. This performance characteristic is precision, which is dependent upon the sampling methodology and the range in natural variation of the reference condition (note -- use of stream classification will increase precision).

The ability to detect impairment also depends on the sensitivity of the method. In some cases, the desirable sensitivity level depends on how severe or subtle the impairment. For example, it does not require a very rigorous method to detect impairment following an extensive fish kill or algal bloom. It is the subtle impact areas that require some level of rigor that minimizes Type I and Type II errors in a judgment of condition.

Based on preliminary information obtained from bioassessments conducted in Florida (Barbour et al. 1996a, Diamond et al. 1996), Ohio (Stribling et al. 1996), and New Hampshire (Stribling et al. 1994), quantitative criteria for precision and sensitivity can be set conservatively at "high" being less or equal to 20%, "moderate" being between 21 and 49%, and "low" being more or equal to 50%. High precision is equated to having low measurement error (coefficient of variation <20%) and sensitivity is the ability to detect small differences (<20% difference) between reference and the site being assessed.

- *AN IDENTIFICATION OF THE APPROPRIATE NUMBER OF SAMPLING SITES that are representative of a waterbody is an important consideration in evaluating biological condition.*

The spatial array of sampling sites in any given watershed or region and the extrapolation of biological condition and water quality to areas beyond the exact sampling point must be established in any type of assessment. Two primary guidelines can be identified for extrapolating biological assessment data to whole watersheds. First, the structure of aquatic communities in lotic (flowing water) systems changes naturally with an increase in size of the stream. Thresholds in this continuum of change can be established through an analysis of regional databases. The biological condition at any particular site can only be used to represent upstream and downstream areas of the same physical dimensions and flow characteristics. Likewise, lake size will influence the number of sites needed to adequately characterize a lake or area of a lake. In small lakes, one site will generally be sufficient. In large lakes with multiple basins or in reservoirs with various zones (inflow, midsection, outflow), a site representative of each basin or zone may be needed.

A second consideration for site identification is the change in land use patterns along a stream gradient or lake shoreline. Changes from agricultural land use to urban centers, forested parkland, etc., would warrant different representative sampling sites. A waterbody with multiple dischargers may also require numerous sampling sites to characterize the overall biological condition of the waterbody.

Technical Support Literature

The Peer Review Team for ALUS recommended several technical papers to be used in support of specific technical issues associated with bioassessment. Information from these and other relevant literature will be incorporated into the revision of this chapter, pending comments and guidance from the Technical Experts Panel. The technical papers recommended by the ALUS Peer Review Team are as follows:

Cummins, K. W. 1988. Rapid bioassessment using functional analysis of running water invertebrates. In: T. P. Simon, L. L. Holst and L. J. Shepard (eds.). EPA -905-9-89-003. Proceedings of the First National Workshop on Biological Criteria. U.S. Environmental Protection Agency, Chicago.

Cummins, K. W. and M. A. Wilzbach. 1985. Field procedures for analysis of functional feeding groups of stream macroinvertebrates. Contribution 1611. Appalachian Environmental Research Laboratory, University of Maryland, Frostburg, Maryland.

Davis, W. S. and T. P. Simon (eds). 1995. Biological assessment and criteria: tools for water resource planning and decision making. Lewis Publishers, Boca Raton, Florida.

Hauer, F. R. and G. A. Lamberti (eds). 1996. Methods in Stream Ecology. Academic Press, San Diego.

Rosenberg, D. M. and V. H. Resh. 1993. Freshwater Biomonitoring and Benthic Macroinvertebrates. Chapman and Hall, New York.

3.3 Primary Contact Recreation Use

All States have recreational waterbodies with bathing areas, as well as less heavily used waterbodies with a designated use of swimming. In some States, nearly all waters are designated for swimming, although the great majority of waters are not used heavily for this purpose. States are asked to first target their assessments of primary contact recreation use to high-use swimming areas such as bathing beaches, a risk-based approach to targeting resources to protect human health.

3.3.1 Bathing Area Closure Data

States should acquire data on bathing area closures from State and local health departments and analyze them as follows.

A. Fully Supporting: No bathing area closures or restrictions in effect during reporting period.

B. Partially Supporting: On average, one bathing area closure per year of less than 1 week's duration.

C. Not Supporting: On average, one bathing area closure per year of greater than 1 week's duration, or more than one bathing area closure per year.

Some bathing areas are subject to administrative closures such as automatic closures after storm events of a certain intensity. Such closures should be reported along with other types of closures in the 305(b) report and used in making use support determinations if they are associated with violation of water quality standards.

3.3.2 Bacteria

States should base use support determinations on their own State criteria for bacteriological indicators.

EPA encourages States to adopt bacteriological indicator criteria for the protection of primary contact recreation uses consistent with those recommended in *Ambient Water Quality Criteria for Bacteria—1986* (EPA 440/5-84-002). This document recommends criteria for enterococci and *E. coli* bacteria (for both fresh and marine waters) consisting of:

- Criterion 1 = A geometric mean of the samples taken should not be exceeded, **and**
- Criterion 2 = Single sample maximum allowable density.

Many State criteria for the protection of the primary contact recreation use are based on fecal coliform bacteria as previously recommended by EPA (*Quality Criteria for Water—1976*). The previous criteria were:

- Criterion 1 = The geometric mean of the fecal coliform bacteria level should not exceed 200 per 100 mL based on at least five samples in a 30-day period, **and**

- Criterion 2 = Not more than 10 percent of the total samples taken during any 30-day period should have a density that exceeds 400 per 100 mL.

If State criteria are based on either of EPA's criteria recommendations outlined above (based on the 1976 or 1986 criteria), States should use the following approach in determining primary contact recreational use support:

A. Fully Supporting: Criterion 1 and Criterion 2 met.

B. Partially Supporting:

- For *E. coli* or enterococci: Geometric mean met; single-sample criterion exceeded during the recreational season, **or**

- For fecal coliform: Geometric mean met; more than 10 percent of samples exceed 400 per 100 mL.

C. Not Supporting: Geometric mean not met.

This guidance establishes a minimum baseline approach; should States have more restrictive criteria, these may be used in place of EPA's criteria. Please indicate when this is the case.

3.3.3 Other Parameters

In addition to pathogens, some States have criteria for other pollutants or stressors for Primary Contact Recreation. As noted by the ITFM, potentially hazardous chemicals in water and bottom sediment, ionic strength, turbidity, algae, aesthetics, and taste and odor can be important indicators for recreational use support determinations. The following guidelines apply where appropriate (i.e., where States have water quality standards for other parameters).

A. Fully Supporting: For any one pollutant or stressor, criteria exceeded in ≤10 percent of measurements.

B. Partially Supporting: For any one pollutant, criteria exceeded in 11 to 25 percent of measurements.

C. Not Supporting: For any one pollutant, criteria exceeded in >25 percent of measurements.

3.3.4 Special Considerations for Lakes

Trophic Status—

Trophic status is traditionally measured using data on total phosphorus, chlorophyll *a*, and Secchi transparency. As mentioned above, comparison of trophic conditions to natural, ecoregion-specific standards allows the best use of this measure.

In this context, user perception surveys can be a useful adjunct to trophic status measures in defining recreational use support. Smeltzer and Heiskary (1990) offer a basis for linking trophic status measures with user perception information. This can provide a basis for categorizing use support based on trophic status data. If user perception data are not collected in the State, extrapolations using data from another State, i.e., best professional judgment, might provide the opportunity to characterize recreational use support in a similar fashion.

Pathogens—

States should consider pathogen data in determining support of recreational uses. Guidelines above also apply to lakes.

Additional Parameters—

In addition to trophic status and pathogens, States should consider the following parameters in determining support of recreational uses:

- Frequency/extent of algal blooms, surface scums and mats, or periphyton growth
- Turbidity (reduction of water clarity due to suspended solids)
- Lake bottom siltation (reduction of water depth)
- Extent of nuisance macrophyte growth (noxious aquatic plants)
- Aesthetics.

3.4 Fish/Shellfish Consumption Use

Fish/Shellfish Consumption Advisory Data

A. Fully Supporting: No fish/shellfish restrictions or bans are in effect.

B. Partially Supporting: "Restricted consumption" of fish in effect (restricted consumption is defined as limits on the number of meals or size of meals consumed per unit time for one or more fish/shellfish species); or a fish or shellfish ban in effect for a subpopulation that could be at potentially greater risk, for one or more fish/shellfish species.

C. Not Supporting: "No consumption" of fish or shellfish ban in effect for general population for one more fish/shellfish species; or commercial fishing/shellfishing ban in effect.

In addition, the ITFM recommended specific indicators for assessing fish and shellfish consumption risks: levels of bioaccumulative chemicals in fish and shellfish tissue for fish and shellfish consumption, and, for shellfish only, paralytic shellfish poisoning (PSP)-type phytoplankton and microbial pathogens.

In areas where shellfish are collected for commercial or private purposes and removed to cleaner waters for depuration, the originating waterbodies should be considered Partially Supporting for Shellfish Consumption use.

3.5 Drinking Water Use

The following guidelines provide a framework for assessment of drinking water use support. These guidelines were developed by EPA in conjunction with the 305(b) Drinking Water Focus Group (DWFG), which consists of interested State and EPA personnel. EPA and States participating in the DWFG made it their goal to develop a workable set of guidelines that would serve to elevate the awareness of drinking water as a designated use within the 305(b) program, increase the percentage of waters assessed for drinking water use support, and enhance the accuracy and value of the assessments.

It was agreed by all parties involved in the development of these drinking water guidelines that no single template is suitable for every reporting State. The guidelines must incorporate flexibility and rely heavily on the judgment of the professional staff of each State's public water supply supervision program to meet the challenges of assessing source waters for drinking water use support.

For purposes of the 1998 305(b) Water Quality Reports, States are asked to focus their assessments on water resources that support significant drinking water supplies. It is generally assumed that most States will initially focus their assessments on surface water resources; however, these guidelines are non-resource-specific and the framework may be applied to any waters within a State that are designated for drinking water use.

EPA and States participating in the DWFG discussed at length the issues and difficulties involved in assessing source waters for drinking water use support. EPA and these States recognize and fully accept that there will be significant variability in the information that States are able to provide in the 1998 305(b) reporting cycle. However, EPA expects that the direction of future reporting cycles will be evident, and that States will begin to develop plans and mechanisms to improve the overall accuracy and value of the assessments.

Key features of these guidelines include:

- assessment of State's water resources in phases over two 305(b) reporting cycles
- flexibility to perform assessments using a tiered approach
- identification of multiple data sources that may be used in the assessments
- assessment of water resources using a target list of contaminants reflecting the interests and goals of the State, and
- interpretation of data.

3.5.1 Prioritization and Phases of Source Water Assessment

EPA and the DWFG recognize that assessment of source waters for drinking water use support within the framework of the following guidelines is revised to achieve the key features listed above. EPA and the DWFG also recognize that assessment of the entire State's water resources for drinking water use support is a monumental task. To ease the burden, States may choose to perform drinking water use support assessments using a phased approach.

States may consider prioritizing their water resources and performing drinking water use support assessments for a limited percentage of their water resources. States are encouraged to expand their drinking water assessment efforts to include additional waters each subsequent reporting cycle. In this way, an increasingly greater percentage of waters will be assessed. Furthermore, this phased approach provides States with the opportunity to develop and implement plans and mechanisms for compilation, organization, and evaluation of drinking water data for improved reporting. EPA encourages States to set a goal of assessing drinking water use support for most of the State (approximately 75 percent of the waterbodies used for drinking water) by the year 2000.

For 1998, States are encouraged to set a priority for reporting results for waters of greatest drinking water demand. For these waters, States may elect to further prioritize with respect to vulnerability or other State-priority factors.

Identifying the presence of "treatment beyond conventional means" is one example of a technique that may be used to screen water resources for potential vulnerability and aid in prioritization of source waters for drinking water assessments. If "treatment beyond conventional means" is present (i.e., treatment beyond coagulation, sedimentation, disinfection, and conventional filtration), it may signify that the source water has been impacted to some degree and warrants more detailed investigation; however, it should be recognized that this information is generally not explicit, and therefore, neither the presence nor the absence of "treatment beyond conventional means" can be positively correlated to drinking water designated use support without additional investigation.

Prioritization of water resources for assessment may best be achieved in coordination with State professionals responsible for collecting and maintaining water quality data for sources of drinking water. It is generally these professionals that are most familiar with the data needed to assess drinking water designated use support and the conditions under which that data were collected. Their insight is integral to assuring the accuracy and value of these assessments.

3.5.2 Tiered Approach for Source Water Assessments

In addition to assessing only a limited percentage of State waters for drinking water use support, EPA and the DWFG encourage States to consider using a tiered approach in the assessments. A tiered approach accommodates the different types of data currently available to States with which to make an assessment and allows for differing levels of assessment.

Initially, States may use the most readily available information such as regional data, agency files, or other existing records or reports to conduct a preliminary assessment. As State programs develop and become more sophisticated, the preliminary assessments can be progressively upgraded through the incorporation of more detailed data (e.g., monitoring data). For 1998, EPA encourages States to provide a short narrative explaining how their assessments were performed and the level of detail incorporated into each assessment.

3.5.3 Data Sources

By instituting the tiered approach to conducting drinking water designated use assessments, EPA and the DWFG are acknowledging that data collection and organization varies among the States, and that a single data source for assessing drinking water designated use does not exist for purposes of the 1998 305(b) reports. EPA encourages States to use available data that they believe best reflect the quality of the resource. EPA is not asking States to conduct additional monitoring that does not fit in with other State priorities.

It is generally accepted that for purposes of the 1998 305(b) reports, States may need to be resourceful to acquire the data necessary to conduct preliminary assessments of source waters for drinking water designated use. States noted during the previous 1996 305(b) reporting cycle that the *Guidelines* placed heavy emphasis on the use of ambient water quality data. Frequently these data were not available and States defaulted to the use of finished water quality data. It was noted by many States that the default to finished water quality data might yield a jaded view of the source water quality.

EPA and the DWFG concur that the use of finished water quality data is not the best possible source of data for assessing source water quality; however, EPA and the DWFG also recognize the difficulties in obtaining data for use in drinking water assessments. By encouraging States to prioritize their water resources and perform drinking water use support assessments in a phased approach over two 305(b) cycles, EPA hopes that acquiring the necessary data will continue to become less difficult in time.

Within the numerous 1996 Amendments to the Safe Drinking Water Act (SDWA), the States are encouraged to use the Source Water Assessment Program (SWAP) to promote assessment of drinking water sources. EPA's August 1997 guidance suggests that States complete source water delineations and source inventory/susceptibility analyses for the public water supplies in the State within two years after EPA approval of the program. These assessments, when completed by the States, are an additional source of data for evaluating drinking water designated use and should contribute considerably to the assessment of drinking water quality.

For the 1998 305(b) reporting cycle, EPA is encouraging States to be resourceful in acquiring and using available data. EPA is not asking States to perform additional monitoring.

EPA and the DWFG identified several potential data sources that States might consider using in their 1998 assessments, including:

- Available ambient water quality data
- Untreated water quality data from public water supply (PWS) wells and/or surface water intakes[1]
- PWS drinking water use restrictions
- STORET database
- Independent water suppliers databases
- Source water assessments (SDWA 1996 Amendments)
- U.S. Geological Survey NAWQA studies
- Private water association studies
- Independent studies
- Other 305(b) use support impairments (e.g., aquatic life impairments).

States that have access to other data sources that can be used to assess source water quality for drinking water purposes are encouraged to use them if, in the judgment of the drinking water professionals, the data have undergone sufficient quality assurance/quality control checks.

Ideally, one or several of the above data sources will be available for States to use in assessing drinking water use support. However, lacking any of the above, States may have no choice but to default to the PWS compliance monitoring data required under the SDWA (i.e., finished water quality data). These data should only be used if the distinct source water can be identified (i.e., mixed systems do not qualify). Information on contamination-based

[1]States that designate for drinking water use only at the point of intake should assess an appropriate area of the source water for drinking water use support. This may require assigning an appropriate area around or distance upstream of the point of intake.

drinking water use restrictions imposed on a source water may also be considered.

3.5.4 Contaminants Used in the Assessment

In many cases, the source of the data will determine the contaminants used in the assessment. For example, if a State has access to ambient monitoring data, the assessment is limited to the monitored contaminants.

Each State should develop a target list of contaminants that best represents the State's assessment goals; this list may be based on monitoring or other sources of data. EPA and the DWFG recommend that States use the contaminants regulated under the SDWA as a starting point in developing their target list of contaminants (a list of the contaminants regulated under the SDWA and their associated maximum contaminant levels is provided in Appendix O). States are not expected to include all of the contaminants regulated under the SDWA as part of their target list.

EPA and the DWFG acknowledge that there are no specific guidelines or hierarchical structure to follow for developing a target list of contaminants for use in drinking water assessments and States must use their best professional judgment in the decision-making process. Important considerations include the availability and quality of data and the level of assessment States are prepared to make. To assist States in reducing the comprehensive list of contaminants regulated under the SDWA to a final, more manageable, grouping of contaminants, EPA and the DWFG recommend that States consider any of the following:

- MCL violations
- detections greater than the action trigger limits
- vulnerability studies
- occurrence data
- chemical waivers
- contamination-based drinking water use restrictions
- treatment beyond conventional means
- treatment objectives
- treatment processes
- treatment technique violations, and/or
- ambient turbidity levels.

EPA and the DWFG realize that the list of contaminants regulated under the SDWA is not an all-inclusive list and States may decide to add contaminants to their target group based on their best professional judgment. For example, States may choose to add contaminants that are not regulated under the SDWA but are of special interest or concern within the State (e.g., pesticides, herbicides, algae, phosphates).

3.5.5 Data Interpretation

EPA and the DWFG developed a framework to assist States in assigning use support categories based on data availability. As shown in Table 3-7, assessments can be based on actual monitoring data that are compared to water quality criteria (e.g., State-specific water quality standards or National Primary Drinking Water Regulations). If States do not have actual monitoring data available, finished water quality data and/or drinking water use restrictions could be used to infer source water quality. Use restrictions include:

- closures of source waters that are used for drinking water supply
- contamination-based drinking water supply advisories lasting more than 30 days per year
- PWSs requiring more than conventional treatment (i.e., other than coagulation, sedimentation, disinfection, and conventional filtration) due to known or suspected source water quality problems
- PWSs requiring increased monitoring due to confirmed detections of one or more contaminants (excluding cases with minimum detection limit issues).

3.5.6 Conclusion

Relatively few source waters have been adequately characterized for drinking water use support during the past 305(b) reporting cycles. EPA and States worked to develop a workable set of *Guidelines* that would serve to elevate the awareness of drinking water as a designated use within the 305(b) program, increase the percentage of waters assessed for drinking water use support, and enhance the accuracy and value of the assessments. These Guidelines provide a flexible framework for assessing drinking water designated use support. Using this framework is expected to result in better, more comprehensive assessments of source waters.

Table 3-7. Assessment Framework for Determining Degree of Drinking Water Use Support

Classification	Monitoring Data		Use Support Restrictions
Full Support	Contaminants do not exceed water quality criteria[a]	and/or	Drinking water use restrictions are not in effect.
Full Support but Threatened	Contaminants are detected but do not exceed water quality criteria[a]	and/or	Some drinking water use restrictions have occurred and/or the potential for adverse impacts to source water quality exists.
Partial Support	Contaminants exceed water quality criteria[a] intermittently	and/or	Drinking water use restrictions resulted in the need for more than conventional treatment with associated increases in cost.
Nonsupport	Contaminants exceed water quality criteria[a] consistently	and/or	Drinking water use restrictions resulted in closures.
Unassessed	Source water quality has not been assessed for contaminants used or potentially present.		

[a] For purposes of this assessment, EPA encourages States to use the maximum contaminant levels (MCLs) defined under the SDWA. However, if State-specific water quality standards exist, and constituent concentrations are at least as stringent as the MCL levels defined under the SDWA, State-specific water quality criteria can be used for assessment purposes.

California Regional Water Quality Control Board

Central Valley Region

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TO: Staff Assisting in 2002 303(d) List Update

FROM: Joe Karkoski
Sr. Land & Water Use Analyst

DATE: 21 May 2001

SIGNATURE: ______________________

SUBJECT: 2002 CLEAN WATER ACT (CWA) SECTION 303(D): PREPARATION OF RECOMMENDATIONS TO THE STATE WATER RESOURCES CONTROL BOARD FROM THE CENTRAL VALLEY REGIONAL WATER QUALITY CONTROL BOARD

A. Introduction

Each of California's nine Regional Water Quality Control Boards has been asked to assist the State Water Resources Control Board in preparing an update to the State's Clean Water Act Section 303(d) list. The 303(d) list identifies surface waters not currently attaining water quality standards. The update to the 303(d) list may include additions of new water bodies and pollutants to the list; removal of water bodies and pollutants from list, if standards are attained; and changes to the description of water bodies currently listed (e.g. refinement of identified impaired reaches, changes in priority, etc).

This document describes the general factors that will considered in the preparation of Regional Board staff recommended changes to the 303(d) list for surface waters within the Central Valley Region. Regional Board staff will describe the specific factors for each recommended change in a Fact Sheet. This memo addresses the following topics: listing/ delisting factors, prioritization, documentation of the recommended changes, documents to be forwarded to the State Board, and public participation.

B. Listing Factors

Water bodies and associated pollutants should be recommended for addition to the 303(d) list if any one of these factors is met:

1. Effluent limitations or other pollution control requirements [e.g., Best Management Practices (BMPs)] are not stringent enough to assure protection of beneficial uses and attainment of

SWRCB and RWQCB objectives, including those implementing SWRCB Resolution Number 68-16 "Statement of Policy with Respect to Maintaining High Quality of Waters in California" [see also 40 CFR 130.7(b)(1)]. This does not apply to non-attainment related solely to discharge in violation of existing WDR's or NPDES permit.

2. Fishing, drinking water, or swimming advisory currently in effect. This does not apply to advisories related to discharge in violation of existing WDR's or NPDES permit.

3. Beneficial uses are impaired or are expected to be impaired within the listing cycle (i.e. in next four years). Impairment is based upon evaluation of chemical, physical, or biological integrity. Impairment will be determined by "qualitative assessment", physical/ chemical monitoring, bioassay tests, and/or other biological monitoring. Applicable Federal criteria and the Regional Board's Basin Plan water quality objectives determine the basis for impairment status.

4. The water body is on the previous 303(d) list and either: (a) monitoring continues to demonstrate a violation of objective(s) or (b) monitoring has not been performed.

5. Data indicate tissue concentrations in consumable body parts of fish or shellfish exceed applicable tissue criteria or guidelines. Criteria or guidelines related to protection of human and wildlife consumption include, but are not limited to, U.S. Food and Drug Administration Action Levels, National Academy of Sciences Guidelines, U.S. Environmental Protection Agency tissue criteria.

C. Delisting Factors

Water bodies may be removed from the list for specific pollutants or stressors if any one of these factors is met:

1. Objectives are revised (for example, Site Specific Objectives), and the exceedence is thereby eliminated.

2. A beneficial use is de-designated after U.S. EPA approval of a Use Attainability Analysis, and the non-support issue is thereby eliminated.

3. Faulty data led to the initial listing. Faulty data include, but are not limited to, typographical errors, improper quality assurance/quality control (QA/QC) procedures, or limitations related to the analytical methods that would lead to an improper conclusions regarding the water quality status of the water body.

4. It has been documented that the objectives are being met and beneficial uses are not impaired based upon an evaluation of available monitoring data. This evaluation should discuss

foreseeable changes in hydrology, land use, or product use and describe why such changes should not lead to future exceedance.

5. A TMDL has been approved by the U.S. Environmental Protection Agency for that specific water body and pollutant (see 40 CFR 130.7(b)(4)).

6. There are control measures in place which will result in protection of beneficial uses. Control measures include permits, clean up and abatement orders, and Basin Plan requirements which are enforceable and include a time schedule (see 40 CFR 130.7(b)(1)(iii).

D. Evaluation Criteria

In general, the following hierarchy should be used in evaluating data relative to applicable water quality objectives:

1. Applicable numeric water quality objectives (contained in the Basin Plan) or water quality standards (contained in the federal California and National Toxics Rules). Both the Basin Plan and federal rules governing a specific parameter should be read carefully, since there can be site specific applications or exceptions.

2. Criteria developed by the U.S. Environmental Protection Agency, California Department of Fish, and the California Department of Health Services and other applicable criteria developed by government agencies. Such criteria will be used to interpret narrative water quality objectives.

3. Guidance or guidelines developed by agencies/entities such as the U.S. Food and Drug Administration, National Academy of Sciences, and the Agency for Toxic Substances and Disease Registry and the California Department of Health Services. Guidelines developed by other agencies should be thoroughly reviewed before applied, since the assumptions and risk factors considered may not be consistent with Regional Board water quality objectives.

4. Criteria or standards developed in other states, regions, or countries. Such criteria should be used with caution. The environmental setting, assumptions, and risk factors considered may not be consistent with Regional Board water quality objectives.

5. Findings in peer-reviewed literature, listing decisions made in similar settings within the State, and/or "weight of evidence" based on information and evaluations performed by outside agencies or groups. Generally, a more extensive description will be needed to justify the impairment (or lack of impairment) determination. Clear links should be described between the literature, findings in similar settings, or outside evaluations and the non-attainment of water quality objectives.

There are no specific minimum data requirements or a specific frequency of exceedance for making a finding that water quality objectives are not attained. In general, more data is needed to interpret environmental results that are very specific to time and geography. Less data would be needed to make a determination based on environmental results that serve as integrators over space or time. So more water column chemistry data would generally be needed to determine impairment than fish tissue chemistry data. Also less water column chemistry data may be needed to make an impairment determination (or lack of impairment determination) if there is other information to support the findings from the water column chemistry (e.g. correlations could be made between pesticide use patterns and the presence of pesticides in surface water).

E. Priority Ranking

A priority ranking is required for listed waters to guide TMDL planning pursuant to 40 CFR 130.7. TMDLs will be ranked into high (H), medium (M), and low (L) priority categories based on:

1. water body significance (such as importance and extent of beneficial uses, threatened and endangered species concerns and size of water body)
2. degree of impairment or threat (such as number of pollutants/stressors of concern, and number of beneficial uses impaired)
3. conformity with related activities in the watershed (such as existence of watershed assessment, planning, pollution control, and remediation, or restoration efforts in the area)
4. potential for beneficial use protection or recovery
5. degree of public concern and involvement
6. availability of funding and information to address the water quality problem
7. overall need for an adequate pace of TMDL development for all listed waters
8. other water bodies and pollutants have become a higher priority

It should be noted that the criteria can be applied in different ways to different water bodies and pollutants. For example, a water body may be severely impaired, but if there is little likelihood of beneficial use recovery than a lower priority might be given.

F. Documentation

A 303(d) update fact sheet should be prepared for each discrete 303(d) listing or delisting decision (see attached template).

1. Fact Sheets for Listing Decisions

Each fact sheet for decisions to add water bodies and pollutants to the 303(d) list should include the following information: Waterbody name, hydrologic unit number, total water body size, pollutant(s)/stressor(s) causing impairment, likely sources, TMDL Development Priority; Size Affected; TMDL Development Start Date; TMDL Development End Date (based on anticipated date for consideration of a Basin Plan Amendment by the Regional Board); the latitude and longitude of the upstream and downstream impaired stream segment and/or a specific narrative description of the impaired segment; a description of the characteristics of the watershed (e.g. flow diversions, rainfall, land uses); the specific water quality objective(s) not being met; a summary of the data assessment that led to the decision to list; the criteria applied to the decision to list; a description of the rationale for the priority ranking; and a bibliography of the information sources used to make the listing decision.

2. Fact Sheets for Delisting Decisions

Each fact sheet for decisions to delete water bodies and pollutants from the 303(d) list should include the following information (see example): the water body name, pollutant(s)/stressor(s) previously identified as having caused an impairment; a summary of the data or information that lead to the decision to delist; the criteria applied to the decision to delist; and a bibliography of the information sources used to make the delisting decision.

3. Fact Sheets to Document Changes to Currently Listed Water bodies/Pollutants

Fact sheets to document changes to currently listed water body/pollutant should focus on the proposed change (e.g. if there is a proposed change in priority, there is no need to describe the extent of impairment). A single fact sheet may be used to document similar changes (e.g. a group of water bodies whose priorities are changing for a similar reason).

4. Files

For each recommended change, a file should be created to support that change. The file should include: a copy of the Fact Sheet and copies of the data or information used to support the recommendation. Selected data or information from reports can be copied, as long as the cover sheet from the report is provided. For data retrieved electronically, the source and date of retrieval should be clearly recorded.

G. Public Participation

Regional Board staff has conducted 3 workshops during the time frame for solicitation of information. The workshops were in Fresno, Sacramento, and Redding. It is anticipated that there will be several more opportunities for public participation after staff has prepared its draft recommendations. The anticipated schedule for Regional Board and State Board action on the 303(d) list is described below:

Process Step	Regional Board	State Board
Public Review of Draft staff Recommended changes to the 303(d) List	Aug 15, 2001 – October 15, 2001	December 2001 – February 2002
Board Meeting	January 2002	March 2002
Comments on EPA Proposed Action		May – June 2002

Although official Regional Board action is not required (only State Board action is required), it is anticipated that the Regional Board will take action to transmit the recommended changes to the 303(d) list to the State Board. As part of that process, we will likely have a public meeting for formal Board action and we will prepare a responsiveness summary. The responsive summary will include a written response to all written comments on the draft 2002 303(d) list received by the cut-off date that is established.

303(d) List Update Process and Issues

Process for writing and reviewing Fact Sheets

1. Gene Davis will be the main contact for tracking who is reviewing which issues and tracking the documents being evaluated.
2. Suggested division of evaluation:
    a. Mercury/other bioaccumulatives (whole Valley)
    b. Pesticides (whole Valley)
    c. Sediment/ temperature (north Valley)
    d. Dissolved oxygen/nutrients (Delta/San Joaquin Valley)
    e. Metals (whole Valley)
    f. Drinking water/pathogens (whole Valley)
    g. Other pollutants (north Valley/above the dams)
    h. Other pollutants (Sac Valley/Delta)
    i. Other pollutants (San Joaquin Valley)
    j. Other pollutants (Tulare Lake)

For each category, staff assigned to do the evaluations will be responsible for proposals for listing, delisting, and changes to currently listed waters.

3. For each main group of pollutants (a-f), write two fact sheets (these can address proposed listing and delistings). This should be completed within two weeks.
4. In addition to fact sheets, the relevant portions of information sources used should be copied and put into a file. Files will also be created for "non-listings" (i.e. where the review of submitted data indicates that no action is needed).
5. Meet to review completed fact sheets for consistency and to address any issues that come up.
6. Complete the rest of the fact sheets. Submit to Joe for review. Jerry will provide final review and approval of fact sheets for inclusion in the staff report.

Proposed Timeline

Task	Completion Date
Agree on process/assignments	5/21/01
Complete example fact sheets	6/14/01
Review completed fact sheets	6/18/01
Complete all fact sheets for recommended changes to 303(d) list	8/17/01
Complete administrative draft staff report for legal/mgmt review	8/24/01
Complete draft for public review	9/4/01
Conduct public workshops	9/01
End public comment period	10/17/01
Review public comments/make changes to recommendations/prepare responsiveness summary	11/17/01
Legal/mgmt review of changes	12/14/01
Board meeting	1/02

Suggested Assignments

Category	Unit/Group
a. Mercury/other bioaccumulatives (whole Valley)	Morris
b. Pesticides (whole Valley)	Karkoski
c. Sediment/ temperature (whole Valley)	Karkoski
d. Dissolved oxygen/nutrients (Delta/San Joaquin Valley)	Grober
e. Metals (whole Valley)	Morris
f. Drinking water/pathogens (whole Valley)	Rasmussen
g. Toxicity (whole Valley)	Karkoski
h. Other pollutants (Sac Valley/Delta)	Karkoski
i. Other pollutants (San Joaquin Valley)	Grober
j. Other pollutants (Tulare Lake/upper SJR watershed)	Wass

Policy Issues

1. Consideration of constructed facilities/ag drains

We should use the categorization that Jeanne Chilcott put together for the ISWP.
Category "B" waters (ag dominated natural streams) would be candidates for listing.
Category "C1" waters (constructed ag supply canals) would be candidates for listing due to ag-related supply water beneficial uses.
Category "C2" waters (constructed ag drains) would not be candidates for listing.
Category "C3" waters (natural modified channels) would be evaluated on a case-by-case basis.

2. Prioritization/Scheduling

In addition to criteria described in the guidance memo, high priority should be given to TMDLs that we think we will work on in the next 5 years, medium priority to those TMDLs we may work on in the next 6-10 years, and low priority to those TMDLs that will be worked on beyond 10 years.

2002 303(d) Fact Sheet Template (RB5 ADMINSTRATIVE DRAFT)
(Specify Here – Addition, Deletion or Change, along with Waterbody/Pollutant Combination being Addressed)

Summary of Proposed Action

A brief summary of the proposed action should be included (is this a change, addition or deletion).

303(d) Listing/TMDL Information

If an existing listed waterbody, changes to the table below should be in strikeout/underline format. Lat/Long are not required, but can be especially helpful when developing the TMDL or establishing permit conditions.

Waterbody Name	Arcade Creek	**Pollutants/Stressors**	Diazinon
Hydrologic Unit	519.21	**Sources**	Urban runoff/Atmospheric deposition
Total Waterbody Size	10 miles	**TMDL Priority**	~~Medium~~ <u>High</u>
Size Affected	10 miles	**TMDL Start Date (Mo/Yr)**	01/98
Extent of Impairment	All of Arcade Creek	**TMDL End Date (Mo/Yr)**	12/11
Upstream Extent Latitude	38° 40' 28"	**Upstream Extent Longitude**	121° 13' 58"
Downstream Extent Latitude	38° 36' 11"	**Downstream Extent Longitude**	121° 30' 52"
Original 303(d) Listing Year	1998		

Watershed Characteristics

This should include a brief description of the major characteristics of the watershed and the waterbody described by the Fact Sheet.

Water Quality Objectives Not Attained (or Objectives being Attained for Deletion)

Specific reference to the water quality objectives in the Basin Plan (or California or National Toxics Rule) not being attained should be made. If a narrative objective is not attained, the applicable criteria or guidelines being used should be described.

Evidence of Impairment

The data demonstrating impairment should be described here (or data demonstrating attainment). A summary of the data/information (including references), along with a comparison to water quality objectives should be provided.

Extent of Impairment (or Extent of Attainment)

The specific stream reach that is impaired should be described (from where specifically to where specifically – if a lake or reservoir, what specific area). Any inferences drawn in determining the extent of impairment based on sampling location, land uses, or other watershed characteristics should be described here.

Potential Sources

The potential sources of the pollutant should be described here. Try to distinguish between suspected sources and known sources (e.g. available data indicates that urban storm drains have levels of diazinon several times higher than creek levels versus urban land use are a suspected source since 80% of the watershed is commercial/residential and diazinon is a commonly used pesticide for pest control on lawns and landscape).

TMDL Priority

The rationale for the priority ranking must be given. The TMDL priority (high, medium, low) must take into account the severity of the pollution problem and the beneficial uses of the waterbody. Other rationales that could be applied include: community interest in addressing the problem; other resources/agencies working on the problem; available funding; the need to develop TMDLs at an adequate pace.

Information Sources

The references or information sources used to develop the recommended action should be described here. Use the references template developed by Michelle Wood.

LAKE ENGLEBRIGHT, MERCURY
2002 303(d) Fact Sheet
Listing

Summary of Proposed Action
The Environmental Protection Agency's (EPA) National Clarifying Guidance for 1998 State and Territory Clean Water Act Listing Decisions states that a waterbody should be placed on the 303(d) list if the waterbody does not meet all applicable water quality standards, including numeric and narrative criteria and designated uses. Based on the federal guidance, the Central Valley Regional Water Quality Control Board (CVRWQCB) adds Lake Englebright to the 2002 303(d) list.

Table 1. 303(d) Listing/TMDL Information

Waterbody Name	Lake Englebright	**Pollutants/Stressors**	Mercury
Hydrologic Unit	517.14	**Sources**	Gold Mine Drainage
Total Length	815 acres	**TMDL Priority**	Medium
Size Affected	815 acres	**TMDL Start Date (Mo/Yr)**	01/04
Extent of Impairment	All of Lake Englebright	**TMDL End Date (Mo/Yr)**	12/11
Upstream Extent Latitude	N 39° 18' 42"	**Upstream Extent Longitude**	W 121° 12' 18"
Downstream Extent Latitude	N 39° 14' 24"	**Downstream Extent Longitude**	W 121° 16' 09"
Original 303(d) Listing Year	2002		

Watershed Characteristics
The Yuba River basin has over 12700 watershed acres and over 1900 total river miles. Water usage ranges from recreational to agricultural and municipal to hydroelectric generation, among others. The basin is bound by the Feather River basin on the north, by the Little Truckee River basin on the east, and by the Bear River and American River basins on the south. The headwaters are located in the Sierra Nevada snowfields at elevations ranging up to 9,100 feet above sea level. The North Fork of the Yuba River flows into Bullard's Bar Reservoir. Water is released at the Bullard's Bar Dam to and goes downstream to join flows from the Middle and South Forks of the Yuba River, which flow into Englebright dam. From the Englebright dam some water is diverted to a North and South Irrigation ditch but the majority continues down stream through Marysville and flows into the Feather River.

Water Quality Objectives Not Attained
The narrative objective for toxicity is not being attained for mercury in Lake Englebright. The narrative toxicity objective in the Basin Plan states, in part, "All waters shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life." The narrative toxicity objective further states that "The Regional Water Board will also consider ... numerical criteria and guidelines for toxic substances developed by the State Water Board, the California Office of Environmental Health Hazard Assessment, the California Department of Health Services, the U.S. Food and Drug Administration, the National Academy of Sciences, the U.S. Environmental Protection Agency, and other appropriate organizations to evaluate compliance with this objective." (CRWQCB-CVR, 1998; http://www.swrcb.ca.gov/~rwqcb5/bsnplnab.pdf).

Numeric criteria for mercury in water and fish tissue have been developed for both human health and wildlife protection. The California Toxics Rule (CTR) lists a criterion of 0.05 micrograms per liter (µg/L) (parts per billion [ppb]) of mercury for freshwater sources of drinking water (for human consumption of water and/or aquatic organisms) (USEPA, 2000). The U.S. Environmental Protection Agency (USEPA) and the California Department of Health Services determined a primary maximum contaminant level (MCL) of 2.0 ppb of mercury for drinking water (Marshack, 2000). In addition, the USEPA established a recommended ambient water quality criterion of 1.4 ppb total mercury (maximum concentration, 1-hour average) for the protection of freshwater aquatic wildlife (USEPA, 1999).

LAKE ENGLEBRIGHT, MERCURY
2002 303(d) Fact Sheet
Listing

The National Academy of Sciences-National Academy of Engineering (NAS) mercury guideline of 0.5 (µg/g) (parts per million [ppm]) (NAS, 1973) applies to whole, freshwater fish and marine shellfish. The United States Food and Drug Administration (FDA) action level of 1.0 ppm (FDA, 1984) applies to the edible portion of commercially caught freshwater and marine fish. In addition, the USEPA recently established a criterion of 0.3 ppm methylmercury in the edible portions of fish for human health protection (USEPA, 2001). The USEPA has also established wildlife criteria for the Great Lakes Water Quality Initiative (USEPA, 1995) and the Mercury Study Report to Congress (USEPA, 1997). These criteria suggest that a range of mercury in fish tissue of 0.08 ppm (trophic level 3 [TL3] fish) to 0.35 ppm (trophic level 4 [TL4] fish) should be protective of wildlife (USEPA, 1997). Because wildlife generally consume lower trophic level (and smaller) fish, the human health and wildlife criteria are not directly comparable.

Evidence of Impairment

Two sets of fish-tissue data are available for Lake Englebright: (1) data collected by the U.C. Davis Division of Environmental Studies (UCD) in 1996, and (2) data collected by the U.S. Geological Survey (USGS) in 1999. The data is summarized in Table 2, below. Based on the USGS data, Placer, Yuba, and Nevada counties have issued an interim public health notification with the cooperation of OEHHA who are in the process of developing a state advisory.

Table 2. Summary of Mercury Concentrations in Fish Tissue Samples from Lake Englebright

Data Source	Sample Year	Number of Samples	Mean Mercury Concentration	Range Mercury Concentration	Percent Samples Above USFDA Criteria (1.0 ppm)	Percent Samples Above NAS Guideline (0.5 ppm)	Percent Samples Above USEPA Criterion (0.3 ppm)
UCD[1]	1996	9	0.62 ppm	0.41 – 0.89 ppm	0 %	78 %	100 %
USGS[2]	1999	21	0.51 ppm	0.08 – 0.96 ppm	0 %	67 %	81 %

[1] Data taken from Slotten etal. *Gold Mining Impacts on Food Chain Mercury in Northwestern Sierra Nevada Streams (1996 Revision).*

[2] Data taken from May etal. *Mercury Bioaccumulation in Fish in a Region Affected by Historic Gold Mining: The South Yuba River, Deer Creek, and Bear River Watersheds, California, 1999.*

Extent of Impairment

Englebright Dam is located in the Sierra foothills 21 miles east of Marysville on State Highway 20. Englebright Dam was constructed primarily to prevent upstream hydraulic mining debris from moving downstream into the Yuba River floodplain. Construction of the dam began in 1938 and was completed in 1941. The dam is a concrete constant angle arch dam, 260 feet tall, and 1,142 feet in length. Englebright Lake is about 227 feet deep at the dam and covers 815 surface acres. It is 9 miles in length and has 24 miles of shoreline. The entire waterbody is impaired by mercury.

Potential Sources

Several inactive and partially active gold mines exist upstream of Englebright Dam in the Yuba River watershed. The Yuba watershed was historically mined extensively for its hardrock and placer gold deposits and has been affected by hydraulic mining (Alpers, 2000). The mines are characterized as alkaline, arsenic containing drainage (Montoya, 1992).

TMDL Priority

Lake Englebright should be listed as medium priority because tissue concentration samples approach the USFDA criteria of 1.0 ppm with a majority of the samples are above the NAS and USEPA criteria.

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SAN JOAQUIN RIVER, DDT
2002 303(d) Fact Sheet
Delisting

Summary of Proposed Action
The Environmental Protection Agency's (EPA) National Clarifying Guidance for 1998 State and Territory Clean Water Act Listing Decisions states that a waterbody may be removed from the 303(d) list if the waterbody meets all applicable water quality standards, including numeric and narrative criteria and designated uses. Based on the federal guidance, the Central Valley Regional Water Quality Control Board (CVRWQCB) removes the San Joaquin River for DDT from the 303(d) list.

303(d) Listing/TMDL Information

Waterbody Name	San Joaquin River	**Pollutants/Stressors**	DDT
Hydrologic Unit	~~544.00~~, 541.10, 535.30	**Sources**	Agriculture
Total Waterbody Size	330 miles	**TMDL Priority**	Low
Size Affected	130 miles	**TMDL Start Date (Mo/Yr)**	01/04
Extent of Impairment	Mendota Pool to Vernalis	**TMDL End Date (Mo/Yr)**	12/11
Upstream Extent Latitude	36° 47' 17.3"	**Upstream Extent Longitude**	120° 22' 21.5"
Downstream Extent Latitude	37° 40' 32.6"	**Downstream Extent Longitude**	121° 15' 54"
Original 303(d) Listing Year	1992		

Watershed Characteristics
The Sierra Nevada Mountains, Coast Ranges, the Delta, and Tulare Lake Basin surround the San Joaquin River watershed. From its source in the Sierra Nevada Mountains, the San Joaquin River flows southwesterly until it reaches Friant Dam (SJVDP, 1990). Below Friant Dam, the San Joaquin River flows westerly to the center of the San Joaquin Valley near Mendota, where it turns northwesterly to eventually join the Sacramento River in the Delta. The main stem of the entire San Joaquin River is about 300 miles long and drains approximately 13,500 square miles.

Water Quality Objectives Attained
The narrative objectives for pesticides and toxicity are attained for DDT in the San Joaquin River. The narrative objective for pesticides states, "No individual pesticide or combination of pesticides shall be present in concentrations that adversely affect beneficial uses." It further states "discharges shall not result in pesticide concentrations in bottom sediments or aquatic life that adversely affect beneficial uses." The narrative toxicity objective in the Basin Plan states, in part, "All waters shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life." The narrative toxicity objective further states that "The Regional Water Board will also consider ... numerical criteria and guidelines for toxic substances developed by the State Water Board, the California Office of Environmental Health Hazard Assessment, the California Department of Health Services, the U.S. Food and Drug Administration, the National Academy of Sciences, the U.S. Environmental Protection Agency, and other appropriate organizations to evaluate compliance with this objective." (CRWQCB-CVR, 1998; http://www.swrcb.ca.gov/~rwqcb5/bsnplnab.pdf)

DDT was banned for use as a pesticide in the United States in 1972. It does not dissolve well in water, binds strongly to soil, and in soil breaks down into the metabolites DDD and DDE (USDHHS, 1995). The Environmental Protection Agency (USEPA) uses the sum of DDTs, including its metabolites and isomers, to derive total concentrations (Davis et al, 2000). USEPA classifies DDT and its metabolites as probable carcinogens (USEPA, 2000). The United States Academy of Sciences-National Academy of Engineering (NAS) numeric guideline of 1000 ng/g (parts per billion (ppb)), applies to whole fish for the protection of fish-eating wildlife (NAS, 1973). The United States Food and Drug Administration (FDA) set 5000 ppb as its action level (AL) for the edible portion (filet) of commercial freshwater and marine fish (FDA, 1984). The Office of Environmental Health Hazard Assessment (OEHHA) uses a screening value (SV) of 100 ppb (OEHHA, 1999) and USEPA uses a screening value of 300 ppb (USEPA, 2000).

Evidence of Attainment
DDT concentrations have declined since the 1970s and 1980s (Davis et al, 2000). The Toxic Substances Monitoring Program (TSMP) and the San Francisco Estuary Institute (SFEI) collected fish tissue samples between 1978 and 1998 in the lower San Joaquin River. Data presented in 1998 are significantly lower than those collected between 1978 and 1990. None of the fish tissue analyzed by the San Francisco Estuary Institute (SFEI) exceeded USFDA action levels or NAS guidelines. Results from the Toxic Substance Monitoring Program (TSMP) and SFEI fish tissue collections are presented in Table 1.

Table 1. Summary of DDT Concentrations in Fish Tissue Samples

Data Source	Sample Years	Number of Samples	Mean DDT Concentration	Range DDT Concentration	Criteria [1]		Percent Samples Above Criteria
TSMP	1978-1990	36	1312.2 ppb	5.1 - 7267 ppb	USFDA-AL	5000 ppb	6%
					NAS	1000 ppb	44%
					USEPA-SV	300 ppb	75%
					OEHHA-SV	100 ppb	81%
SFEI	1998	13	79.3 ppb	17 - 389 ppb	USFDA-AL	5000 ppb	0%
					NAS	1000 ppb	0%
					USEPA-SV	300 ppb	8%
					OEHHA-SV	100 ppb	23%

[1] USFDA-AL = United States Food and Drug Administration action level.
NAS = National Academy of Sciences guideline
USEPA-SV= United States Environmental Protection Agency screening value.
OEHHA-SV = Office of Environmental Health Hazard Assessment screening value.

Extent of Attainment
San Joaquin River was originally placed on the 303(d) list in 1992 due to high DDT concentrations in fish tissue. Approximately 130 miles of the Lower San Joaquin River, between the Mendota Dam and Vernalis, are currently listed as impaired by DDT. This 130-mile reach of the Lower San Joaquin River drains approximately 4,530 square miles (2.9 million acres) in portions San Joaquin, Merced, Stanislaus, Tuolumne, Madera, Mariposa, and Fresno counties. The major tributaries to the Lower San Joaquin River are on the east side of the San Joaquin Valley, with drainage basins in the Sierra Nevada Mountains. These major east side tributaries are the Stanislaus, Tuolumne, and Merced Rivers. Several smaller, ephemeral streams flow into the San Joaquin River from the west side of the valley. These streams include Hospital, Ingram, Del Puerto, Orestimba, San Luis, and Los Banos Creeks. Mud Slough (north) and Salt Slough also drain the Grassland Watershed on the west side of San Joaquin Valley. The entire 130-mile segment of the San Joaquin River attains USFDA's and NAS' criteria for DDT.

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Consolidated Assessment and Listing Methodology

Toward a Compendium of Best Practices

DRAFT for State REVIEW and COMMENT

April 20, 2001

Prepared By:
Environmental Protection Agency
Office of Wetlands, Oceans and Watersheds

With Assistance From:
EPA Regional Offices
Office of Science and Technology
Office of Research and Development
Office of Ground Water and Drinking Water
Office of Wastewater Management
Office of Environmental Information

Consolidated Assessment and Listing Methodology
DRAFT for State REVIEW and COMMENT

Contents

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CALM Chapter 1
State Review Draft

1. Introduction

This document outlines an iterative process, a series of steps toward improved state monitoring and assessment programs. The first step is for states to document their decision making process for attainment of water quality standards and to make that process transparent and available to the public. The second step is to expand the states' monitoring coverage to assure that data will be available to make attainment decisions for all state waters. The third phase is to update decision making methodologies as more high quality data become available.

This document is intended to provide information to states and other jurisdictions responsible for collecting data and information on water quality which is used for the following purposes:

! Determining the extent that waters within their jurisdiction are attaining water quality standards (305(b))
! Identifying waters that are impaired and need to be included on the Section 303(d) list of impaired waters

The document is divided into three major parts. Part A addresses the review and analysis of data to determine whether they indicate a water is impaired or attaining water quality standards. Part B covers the design of water quality monitoring programs to collect the data . Part C describes reporting content and format.

1.1 What is the Objective of this Document?

The immediate objective of this document is to provide a framework for states, territories, interstate commissions and authorized tribes to document the decision making processes used to assess water quality standards (WQS) attainment. This framework includes not just the organizational structure for documenting the state's assessment and listing methodology, but it also provides information on appropriate methodologies. For example, it describes each of the types of data that support water quality decision making and how they are used in the context of applicable water quality standards to support different water quality determinations.

In the short-term, this framework is intended to promote better documented water quality assessments and transparency in decision making about water quality standards attainment and to foster greater participation among organizations involved in water quality monitoring and assessment activities. Over the long-term, these efforts will result in more comprehensive, more efficient, and more effective water quality monitoring programs. Clearly, this is an ongoing process, involving continual fine tuning and improvement of not just the states' water quality assessment methodologies and monitoring programs, but also of the framework and information on methodologies in order to keep pace with advances in water quality assessment techniques and increasing technical expertise.

This document does not attempt to reproduce the volumes of existing technical guidance on water quality monitoring. Instead, it presents a framework for integrating these other documents into a consolidated monitoring, assessment and listing methodology. Wherever possible, this document includes citations (and on the web, links) to additional references and resources on data quality, data interpretation methods, monitoring design and other technical issues related to water quality assessments and listing decisions. This approach encourages the functional integration of monitoring, data documentation and sharing, data analysis and interpretation, across state programs and other partners involved in water quality characterization and decision making.

1.2 Organization and Format of the Document

This document is formatted as a series of questions which states, territories, interstate commissions, and authorized tribes need to answer to document their current methodology. For each of these questions, the document provides some context about why they are relevant and some examples of appropriate ways to answer them. The examples are drawn primarily from existing guidance and state programs and proposals. The questions may already be addressed through existing state/interstate/tribal monitoring strategy documents, quality assurance project plans, and/or water quality standards implementation procedures. To the extent these other documents describe the assessment and listing methodology, the states' work is essentially done and can merely be cross-referenced or compiled into a single consolidated assessment and listing methodology.

The remainder of this document is organized into three parts. Part A deals with the overall management question of water quality standards attainment decisions and identification of impaired waters. Part A is organized according to the types of data that may be used to support water quality standards attainment decisions. Within each of these chapters, the document sets forth questions for states about how they define data quality requirements and how they utilize and interpret data to make decisions about whether a water is impaired or attaining water quality standards. Part A concludes with a chapter that asks states how they integrate multiple types of data applicable to a specific designated use when identifying waters that are impaired or attaining water quality standards.

Part B deals with designing a comprehensive monitoring program to assess the extent that waters are attaining WQS and to identify the waters that are impaired. This part addresses the overall design of water quality monitoring programs, including documenting monitoring goals and data quality objectives for the type, amount and scale of data needed. One chapter explores options for extending monitoring programs over time to cover all water resource types including lakes, rivers, wetlands, estuaries, coastal waters. It presents information on using probability-based sampling design to generate state-wide characterizations of the extent of waters attaining water quality standards or impaired. Another chapter describes a targeted or follow-up stage of sampling designs for making attainment/impairment decisions about specific drainage areas, waterbodies or segments.

Part C describes approaches for reporting on water quality standards attainment for both the 305(b) water quality inventory and the 303(d) list of impaired waters. This section addresses the documentation necessary to communicate the findings and the basis of attainment/impairment decisions. It provides different options for presenting findings at different scales relevant to the sampling design. For example, a 305(b) report may have one section that presents the overall extent of water quality conditions based on state-wide probability designs followed by a series of watershed or basin level sections that present the results of finer scale monitoring designed to identify impaired waters.

The question and answer format of this document provides a framework for the contents of a consolidated assessment and listing methodology and information, including examples, about ways to respond to the questions. The examples given are not exclusive options for responding so that flexibility is allowed to reflect the legitimate variations among states, territories and authorized tribes in the water quality standards and implementation procedures they adopt. We understand that not all states currently have programs that reflect the information and examples described in the document, and expect that these states may take this opportunity to define the improvements needed in their programs, to develop an implementation plan and time line for moving toward these improvements in their monitoring programs and their assessment and listing methodology.

CALM Chapter 2
State Review Draft

Overview of the Consolidated Assessment and Listing Methodology Framework

Contents

CALM Chapter 2
State Review Draft

2. Overview of the Consolidated Assessment and Listing Methodology Framework

States use a variety of data and information to assess water quality and make specific management decisions ranging from determining existing uses to issuing point-source discharge permits and non-point source control grants. The more confidence managers have in the underlying water quality data, the more confident they are in their subsequent management decisions. Managers cannot always obtain a full suite of water quality data to support their decision making. In these situations, they make educated judgements with data and information that provide insights into water quality conditions and likely concerns, but don't provide the level of confidence desired. Adequate funding of monitoring programs, full utilization of valid data from volunteer and other sources, and better linkages between management decisions and monitoring program design will help boost management confidence in its decision making capabilities and ensure more effective water quality management programs.

This guidance not only addresses documentation but provides a framework for evaluation of data gathering and analysis for states and Tribes to better document the quality of data used to support water quality decisions. It begins by asking states to clearly articulate the data quality objectives for collecting and analyzing data that supports their management decisions. The framework provides for quality assurance and quality control procedures to be clearly described for each type of data. It asks for a description of data analysis procedures, both for screening the quality of data sets and for interpreting their results in the context of state water quality standards. These are the key elements of the assessment and listing methodology. These elements are the subject of part A of this document. Parts B and C address two additional and integral components of an overall water quality assessment program. Part B provides guidance on monitoring design. Part C describes data management and reporting.

CALM Chapter 3
State Review Draft

Using Chemical Data as Indicators of Water Quality

Contents

CALM Chapter 3
State Review Draft

3. Using Chemical Data as Indicators of Water Quality

A complete assessment of water quality demands consideration of different types of data because each provides unique insights into water quality standards attainment status. This chapter addresses the role of chemical data in assessing water quality standards attainment and listing impaired waters. Chapters 4 through 8 cover biological, physical, toxicity, pathogen, and habitat data, respectively. Note that conventional indicators such as temperature, pH, and dissolved oxygen, which are sometimes referred to as physical data, are included in this chapter because they are generally treated as chemical indicators of water quality.

Chemical data are important indicators of water quality standards attainment/impairment for a number of reasons. All state, territory and authorized tribal water quality standards include numeric water quality criteria adopted to protect aquatic life and human health from the effects of pollution. Assessments of chemical concentrations serve as direct measures of stressors to aquatic life and human health. Chemical-specific data and water quality models allow predictions of the likelihood of impacts to aquatic life and human health where they may not yet have occurred. Chemical pollutants also lend themselves to chemical-specific TMDL development and source controls, particularly as expressed in NPDES discharge permits.

Using chemical data involve issues related to data quality and ensuring that data are representative of water quality conditions. This chapter is structured to help states reduce uncertainty by documenting their approaches for using chemical data to make water quality standards attainment decisions and list impaired waters. Each section title poses a question that addresses an element of a state's assessment and listing methodology.

3.1 How are Chemical Data Used Within the Context of the State's WQS?

State water quality standards play a central role in a state's water quality management program. Standards drive water quality assessments, 303(d) lists of impaired waters, 305(b) reports on water quality status and trends, TMDLs, NPDES permits, and nonpoint source management measures. These standards include designated uses appropriate for each waterbody, numeric and narrative criteria adopted to protect the uses, and policies to prevent degradation of waters. Chemical data primarily support assessments of the extent to which numeric and narrative criteria are met. The state's assessment and listing methodology should describe how chemical data are collected and how they are used to determine attainment with applicable water quality standards.

States, territories, and authorized tribes adopt water quality criteria to protect designated uses, including aquatic life, recreation, public water supply, fish and shellfish consumption. The criteria must be based on sound scientific rationale and must contain sufficient indicators or parameters to protect the designated uses. Water quality criteria are numeric criteria derived from EPA's 304(a) criteria guidance documents or other scientifically defensible methods, or narrative criteria adopted serve where numeric criteria cannot be determined or to supplement numeric criteria.

3.1.1 Numeric Criteria

Under Section 304 of the Clean Water Act, states, territories, and authorized tribes adopt chemical-specific numeric criteria into their WQS to protect designated uses. These criteria generally include:

- Aquatic life thresholds for acute or chronic exposure of sensitive organisms
- Human health thresholds for cancer risk or non-cancer risk due to exposure via drinking water and fish tissue consumption
- Organoleptic effect thresholds for drinking water consumption and recreation

EPA publishes water quality criteria guidance that consist of scientific information regarding concentrations of specific chemicals in water that are protective of aquatic life and human health. EPA is also working on guidelines that address chemical concentrations in sediment and fish tissue. States may use these criteria guidelines as the basis for developing regulatory chemical criteria and adopting them as part of their water quality standards. States may modify the national criteria or employ other scientifically defensible techniques for developing water quality criteria.

The complete listing of EPA recommended water quality criteria can be found in *National Recommended Water Quality Criteria–Correction* (EPA 822-Z-99-001) or at http://www.epa.gov/ost/standards/wqcriteria.html. Table 3-1 lists state web sites where individual state water quality standards, including numeric criteria are presented in detail. Another source for state water quality standards and criteria is the EPA web site: http://.................... [still under development]

Numeric Criteria for Aquatic Life Protection

The development of numeric water quality criteria for aquatic life protection is a complex process described in each of EPA's criteria guidance documents and summarized in the *Water Quality Standards Handbook* (EPA 823-B94-005a). The process involves collecting and analyzing data on a specific chemical concerning its toxicity to and bioaccumulation by aquatic organisms. To serve as a basis for criteria guidance, data must be available for at least one species in each of at least eight different families. If enough acceptable data are available, EPA derives a recommended acute and chronic criterion. Acute thresholds estimate the highest one-hour concentration that will not have a lethal effect on 95 percent of the species tested. Similarly, chronic thresholds estimate the highest four-day concentration that should not cause unacceptable toxicity during long term exposure. Acute or chronic criteria are adjusted to reflect water quality characteristics such as pH, temperature or hardness, which affect the bioavailability of some pollutants and associated exposure risks for aquatic life. Separate criteria may be developed for fresh and salt waters.

Table 3-1. State agency web sites for water quality standards and criteria (current as of February 2001)

State	WQS Web Address
AK	http://www.state.ak.us/local/akpages/ENV.CONSERV/dawq/dm/wqsmain/regs.htm
AL	http://www.adem.state.al.us/RegsPermit/ADEMRegs/Div6Vol1/rdiv6v1.html http://www.adem.state.al.us/RegsPermit/PropRules/proprule.htm
AR	http://www.adeq.state.ar.us/regs/reg02.htm
AZ	http://www.sosaz.com/public_services/Title_18/18-11.htm
CA	http://www.swrcb.ca.gov/plnspols/index.html
CO	http://www.cdphe.state.co.us/cdphereg.asp#wqreg
CT	http://dep.state.ct.us/wtr/wqs.pdf
DE	http://www.dnrec.state.De.us/water/wqs1999.pdf
FL	http://www.dep.state.fl.us/ogc/documents/rules/shared/62-302.pdf http://www.dep.state.fl.us/ogc/documents/rules/shared/62-302t.pdf
GA	http://www.ganet.org/dnr/environ/rules_files/exist_files/391-3-6.pdf
HI	http://mano.icsd.hawaii.gov/doh/rules/ADMRULES.html
IA	http://web.legis.state.ia.us/Rules/2000/iac/567iac/56761/
ID	http://www2.state.id.us/adm/adminrules/rules/IDAPA58/58INDEX.HTM http://www2.state.id.us/adm/adminrules/bulletin/sept00.pdf
IL	http://www.ipcb.state.il.us/title35/download/C302.pdf
IN	http://www.ai.org/legislative/iac/title327.html
KS	http://www.kdhe.state.ks.us/download/index.html#bowreports
KY	http://www.lrc.state.ky.us/kar/401/005/026.htm
LA	http://www.deq.state.la.us/planning/regs/title33/index.htm#partix
MA	http://www.state.ma.us/dep/brp/wm/files/314cmr4.pdf
MD	http://209.15.49.5/dsd_web/default.htm
MI	http://www.deq.state.mi.us/swq/
MO	http://mosl.sos.state.mo.us/csr/10csr/10c20-7.pdf
MS	http://www.deq.state.ms.us/newweb/opchome.nsf/pages/SurfaceWaterfiles/$file/wqc.pdf
ME	http://janus.state.me.us/legis/statutes/38/title38ch30sec0.html
MN	http://www.revisor.leg.state.mn.us/arule/7050/
MT	http://www.deq.state.mt.us/dir/Legal/Chapters/CH30-06.pdf

State	WQS Web Address
NC	http://mapsweb01.sips.state.nc.us/ncoah/ncadministrativ_/title15aenviron_/chapter02enviro_/default.htm
NE	http://www.deq.state.ne.us/RuleAndR.nsf/pages/117-TOC
ND	N/A
NH	http://www.des.state.nh.us/wmb/Env-Ws1700.pdf
NJ	http://www.state.nj.us/dep/landuse/njac/7-9b.pdf http://www.state.nj.us/dep/watershedmgt/swqs/
NM	http://www.nmenv.state.nm.us/NMED_regs/swqb/20nmac6_1.html
NV	http://www.leg.state.nv.us/NAC/NAC-445A.html
NY	http://www.dec.state.ny.us/website/regs/ch10.htm
OH	http://www.epa.state.oh.us/dsw/rules/3745-1.html
OK	http://www.state.ok.us/~orwb/rules/Chap45.pdf
OR	http://waterquality.deq.state.or.us/wq/wqrules/wqrules.htm
PA	http://www.pacode.com/secure/data/025/chapter93/chap93toc.html
PR	N/A
RI	http://www.state.ri.us/dem/REGS/WATER/QUALREGS.PDF
SC	N/A
SD	http://legis.state.sd.us/rules/rules/7451.htm
TN	http://www.state.tn.us/sos/rules/1200/1200-04/1200-04.htm
TX	http://www.tnrcc.state.tx.us/oprd/rules/pdflib/307`.pdf
UT	http://www.rules.state.ut.us/publicat/code/r317/r317-002.htm
VA	http://ftp.deq.state.va.us/pub/watrregs/wqs.zip
VI	N/A
VT	http://www.state.vt.us/wtrboard/july2000wqs.htm
WA	http://www.ecy.wa.gov/biblio/wac173201a.html
WI	http://www.legis.state.wi.us/rsb/code/nr/nr100.html
WV	http://www.state.wv.us/csr/docs/WPDocs/4601 .wpd

N/A means WQS not on the web or web address not available at time of compilation.

The Acute Criterion (Criteria Maximum Concentration, CMC) equals the highest concentration of a pollutant to which aquatic life can be exposed for a short period of time without deleterious effects. The Chronic Criterion (Criteria Continuous Concentration, CCC) equals the highest concentration of a pollutant to which aquatic life can be exposed for an extended period of time (4 days) without deleterious effects (40 CFR 131.38). For ammonia, a 30-day rather than 4-day average is recommended. Alternative averaging periods can be developed using data that relates toxic response, including delayed mortality, with exposure time or using models of toxicant uptake and action (EPA, 1991). Both the acute and chronic exposure durations were set to be fully protective of fast-acting toxicants, and are therefore even more protective for slower-acting toxicants.

Early in the water quality standards program, EPA criteria guidance for several parameters including chlorides, turbidity and temperature stated these criteria should not be exceeded at any frequency. EPA recommends the acute and chronic aquatic life criteria for toxics not be exceeded more than once in a three year period. EPA selected this exceedance frequency to provide a level of protection similar to the 7Q10 design flow or low flow condition. This approach was also supported by a literature review of studies of ecological recovery from a variety of severe stresses, such as chemical exposure, logging, flooding, channelization, dredging and drought. Because of the nature of the literature, EPA could not make strong connections between the severity of chemical criteria excursions and the ecological response. The exceedance frequency is considered highly protective. Like the magnitude and duration components of the water quality criteria, it may also be revised to reflect site-specific information on exposure and response relationships.

Numeric Criteria for Human Health Protection

States adopt ambient numeric chemical criteria for human health protection to protect public water supply, fish consumption, and recreational uses of surface waters. A few states have adopted criteria to protect humans from chemical concentrations in ground water. States may adopt numeric fish tissue-based chemical criteria for the protection of human health from consumption of mercury in fish.

In 2000, EPA published revisions to the methodology for developing ambient water quality criteria for the protection of human health. These revisions incorporate the latest scientific information for developing water quality criteria, including systematic procedures for evaluating cancer risk, noncancer health effects, human exposure, and bioaccumulation potential in fish (*Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health (2000);* EPA-822-B-00-004 or http://www.epa.gov/ost/humanhealth/method/index.html).

The revised methodology provides more flexibility for decision-making at state, tribal and EPA regional levels. Specifically, it provides opportunity for states, territories, and tribes to use tailored information on fish consumption rates, acceptable risk levels, and other factors that influence the calculations of chemical criteria. EPA believes that adoption of water quality criteria require several risk management decisions that are often better made at the state, territory and tribal level.

Water quality criteria to protect human health generally are based on protecting against long-term exposure to low concentrations of a toxic pollutant. When applying a chemical human health criterion to water quality standards attainment decisions, EPA recommends comparing the mean of the measured ambient concentrations to the criterion. If the mean exceeds the criterion, the water quality standard is not being attained.

3.1.2 Narrative Criteria

To supplement numeric criteria for toxic chemicals, states adopt narrative criteria. These criteria help ensure that all designated uses are protected under a wide range of circumstances. Narrative criteria are effective tools for addressing toxic effects of pollutants, exposure pathways, or exposure conditions for which the state has not adopted chemical-specific numeric criteria. Narrative criteria, which are often referred to as "free froms" were first developed in 1968 and continue to be an important element of state, territory and tribal water quality standards.

EPA guidance explains that these "free froms" apply to all waters of the United States at all flow conditions, including ephemeral and intermittent streams (EPA 1994). Narrative criteria guidance indicates that all waters be free from substances that:

- Cause injury to, or are toxic to, or produce adverse physiological responses in humans, animals or plant
- Settle to form objectionable deposits
- Float as debris, scum, oil, or other material in concentrations that form nuisances
- Produce objectionable color, odor, taste, or turbidity
- Produce undesirable aquatic life or result in the dominance of nuisance species.

There are numerous examples where chemical data is used to interpret a narrative criterion. For example, a state may use chemical concentrations in sediment, in conjunction with other information on sediment toxicity and the health of benthic communities, to identify a water as impaired due to sediment contamination. Another example of the use of chemical data to interpret narrative criteria is the use of fish tissue data. The concentrations of pollutants in fish tissue can be used in risk-based calculations to assess attainment of the fish consumption use as well as to issue fish consumption advisories. States may use narrative criteria to determine that a surface water is impaired for its public water supply use. This decision might be triggered by a finding that a drinking water utility has violated a chemical-specific maximum contaminant level for treated water and that chemical is present in the ambient surface water.

EPA encourages states, territories and authorized tribes to use chemical data to interpret narrative criteria, however, these jurisdictions should develop implementation procedures that explain how different types of chemical data are used to make attainment/impairment decisions based on narrative criteria.

3.2 What Actions does the State Take to Assess and Document Data Quality, Including Third-Party Data?

This is an important question because it acknowledges that not all data are of equal value for assessing water quality standards attainment/impairment. Results of chemical data, or any other type of data, analysis are of limited value unless they are accompanied by documentation about sample collection, analytical methods and quality control protocols. Poorly documented monitoring results may provide an indication of potential problems, corroborate other data and information, or trigger additional monitoring, but they are unlikely to support an attainment or impairment decision if they fail to meet accepted data quality objectives. Chemical data with good data quality documentation must be used to support an attainment/impairment decision.

Several states are reexamining and better defining requirements for acceptable data and protocols for screening data adequacy prior to interpreting data to make water quality standards attainment decisions. EPA has extensive technical documents on this topic, some of which are listed in the references to this chapter. Documenting data quality requirements and data evaluation procedures is a critical element that states must address.

It is important to balance data quality requirements with common sense. Data quality requirements must be objective and inclusive. States, territories, and authorized tribes must consider of all existing and readily available data when making water quality standards attainment/impairment decisions. Data should not be excluded solely because of its source or its age, without a reasonable description about why it is not representative of water quality conditions. Similarly, data collected using different methods than the state prefers should be considered if the detection limits for the method are appropriate for both the criteria threshold and the concentration detected.

3.2.1 How does the state define data quality?

As noted in Chapter 2, EPA encourages states, territories, interstate commissions, and authorized tribes to use the data quality objectives process to define minimum quality data requirements. This includes information on appropriate sample size and monitoring design, sample collection and handling protocols, analytical methods and detection limits, quality control procedures, and data management. Frequently this type of information is documented in the state's quality assurance project plan or standard operating procedures for monitoring. Some data quality requirements are defined in the applicable water quality standards or implementation procedures.

It is important to make this information available to other organizations such as tribal, interstate, state, federal, academic, and volunteer citizen groups that also monitor water quality. Over time, these potential partners may agree to meet your data quality requirements if your agency clearly spells out these requirements in your assessment and listing methodology or other readily available and well-publicized documents.

Sample size is an important element of data quality. In general, statistical tests have a high level confidence with 30 or more samples. Small sample sizes have a low probability of detecting water quality standards exceedances, unless they are wide-spread and, therefore, are more likely to err on the side of being under-protective. Figure 3-1 illustrates the effect of sample size on the probability of detecting more than one criteria exceedance when the actual frequency of exceedances is between zero and 50 percent. Documenting the confidence and power of a decision based on the size of the data set can be an effective tool in illustrating the benefits of appropriate sample sizes. Appendix B describes these issues in more detail and provides guidance and additional references on determining sample sizes.

3.2.2 How does the state assess (review and evaluate) data quality?

Data quality assessment means the scientific and statistical evaluation of data to determine if data obtained from monitoring operations are of the right type, quality, and quantity to support water quality attainment decisions. Data quality does not exist in a vacuum; one must know in what context a data set is to be used in order to determine whether the data set is adequate.

Guidance for assessing the quality of available datasets is described in detail in *Practical Methods for Data Quality Assessment* (EPA/600/R-96/084). For assessing WQS attainment, EPA recommends a tiered approach. The following steps should be part of the first tier of your data quality review process:

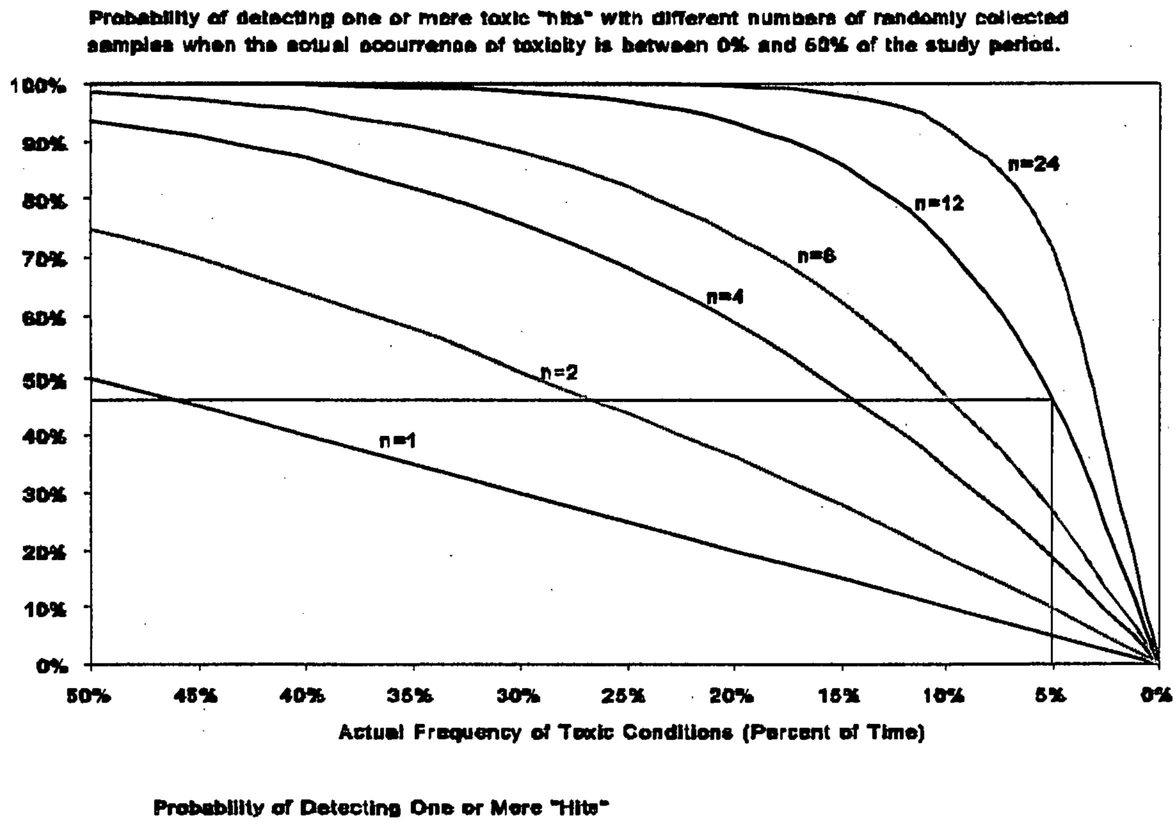
- Screen documentation to determine if appropriate procedures were used and quality assurance/quality control (QA/QC) measures were in place (e.g., if the third party's field and laboratory procedures are documented in standard operating procedures (SOPs))

- Determine if samples were collected under the appropriate conditions for comparison to water quality standards (e.g., correct time of year or flow conditions)

- Review sample collection and analytical methods to determine compatibility with your agency's QA/QC requirements and SOPs; also determine if the third party's sample collection and analytical methods were actually followed in creation of the data set

- Determine if the metadata accompanying the data set meets your agency's requirements; (e.g., determine adequacy and accuracy of geographic documentation in the data set).

Figure 3-1 Effect of Sample Size on Probability of Detecting Criteria Exceedance



Once you determine that the data set meets your basic documentation requirements, you might decide to do additional screening of the actual data sets. At a minimum, you might want to look for values below the detection limit of the analytical method, because these may influence how you analyze the data set or incorporate it with other data. If upon analyzing the data, the findings cause you to suspect errors in the collection or analysis, you may want to conduct more in-depth analysis of QA/QC procedures. This screening could include reviews of QA/QC reports to determine if the data set meets your agency's QA/QC requirements regarding documenting measurement system performance (e.g., adequate use of QC samples), the approach to handling missing data and non-detects, and deviations from SOPs.

3.2.3 How does the state document the level of data quality?

The 305(b) Consistency Workgroup developed a table assigning qualitative levels of information or data quality to different types of chemical data. Several states have since developed similar approaches for rating the quality of data used in water quality standards assessments. States are encouraged to use an approach similar to that described in Table 3-2 to report on the quality of data supporting attainment/impairment decisions. In addition, they should begin documenting quantitative information about the quality of these decisions.

The data hierarchy described in Table 3-2 addresses data quality considerations such as sample collection and analytical techniques, spatial and temporal representativeness, and quality assurance procedures. The user rates the data set based on the rigor of the information, where 1 is the lowest and 4 is the highest. In general, Level 1 information alone is not sufficient for an attainment decision; however, even a short period of record can indicate impairment in cases of gross exceedances of criteria.

States should supplement the level of data descriptions illustrated in Table 3-2 with more quantitative descriptions of the confidence and power of their attainment/impairment decisions. This documentation clearly illustrates to decision makers and the public the impact of small data sets on the uncertainty in the water quality decision. Quantitative documentation of the uncertainty is expressed in statistical terms of the error rates, both Type I decision error or the á-level and Type II decision error or the â-level of the assessment. These decision errors are discussed in detail in Appendix B. A Type I error occurs when an attaining waterbody is erroneously judged to be impaired and a Type II error occurs when an impaired waterbody is erroneously judged to be attaining. Both types of error have negative consequences and costs to society. EPA encourages states to collect sufficient numbers of samples to balance both types of error at reasonable levels.

To summarize, for attainment decisions based on chemical data, states should document:

- Level of information based on Table 3-2 or state-developed table or approach.
- Sample size, range of concentrations, mean, median, and standard deviation
- Level of statistical confidence (Type I decision error and Type II error), and width of the confidence interval.

Table 3-2. Hierarchy of Chemical Data Levels for Evaluation of Aquatic Life Use Attainment

Level of Info[a]	Sample Collection and Analytical Techniques	Spatial and Temporal Representativeness	Data Quality
1	Any one of the following: • Water quality monitoring using grab water sampling • Water data extrapolated from an upstream or downstream station where homogeneous conditions are expected • Best professional judgment based on land use data, source locations	Low spatial and temporal coverage: • Quarterly or less frequent sampling with limited period of record (e.g., 1 day) • Limited data during key periods or at high or low flows (critical hydrological regimes)[b]. • Data are >5 years old and are not reflective of current conditions	Approved QA/QC protocols not followed or QA/QC results inadequate Methods not documented Inadequate metadata
2	Any one of the following: • Water quality monitoring using grab water sampling • Rotating basin surveys involving multiple visits or automatic sampling • Synthesis of existing or historical information on fish contamination levels • Screening models based on loadings data (not calibrated or verified).	Moderate spatial and temporal coverage: • Bimonthly or quarterly sampling during key periods (e.g., spring/ summer months • Fish spawning seasons, including limited water quality data at high and low flows • Short period of record over a period of days or multiple visits during a year or season. • Data are <5 years old and there is high certainty that conditions have not changed since sampling	Approved SOPs used for field and lab; limited training Low precision and sensitivity QA/QC protocols followed; QA/QC results adequate Adequate metadata
3	Any one of the following: • Composite or a series of grab water sampling used (diurnal coverage as appropriate) • Rotating basin surveys involving multiple visits or automatic sampling • Calibrated models (calibration data <5 years old).	Broad spatial and temporal (long-term, e.g., > 3 years) coverage of site with sufficient frequency and pollutant coverage to capture acute events: • Typically, monthly sampling during key periods (e.g., spring/ summer months, fish spawning seasons), multiple samples at high and low flows • Lengthy period of record (sampling over a period of months). • Data are <5 years old and there is high degree of certainty that conditions have not changed since sampling	Moderate precision and sensitivity Samplers well trained SOPs used for field and lab; Moderate precision/ sensitivity; QA/QC protocols followed; QA/QC results adequate Adequate metadata
4	All of the following: • Water quality monitoring using composite or series of grab samples (diurnal coverage as appropriate) • Limited sediment quality sampling and fish tissue analyses at sites with high probability of contamination.	Broad spatial (several sites) and temporal (long-term, e.g., > 3 years) coverage of site with sufficient frequency and parametric coverage to capture acute events, chronic conditions, and all other potential chemical impacts • Monthly sampling during key periods (e.g., spring/summer months • Fish spawning seasons (including multiple samples at high and low flows) • Continuous monitoring. • Data are <5 years old and there is high degree of certainty that conditions have not changed since sampling.	High precision and sensitivity Samplers well trained SOPs used in field and lab QA/QC protocols followed; QA/QC results adequate Adequate metadata

[a] Level of information refers to rigor of chemical sampling and analysis, where 1 = lowest and 4 = highest.

[b] Even a short period of record can indicate a high confidence of *impairment* based on chemical data; 3 years of data are not required to demonstrate impairment. For example, a single visit to a stream with severe acid mine drainage impacts (high metals, low pH) can result in high confidence of impairment. However, long-term monitoring may be needed to establish full attainment.

3.3 How does the state analyze and interpret chemical data to determine WQS attainment/impairment?

The most important element of the state's assessment and listing methodology is documentation of how the state analyzes and interprets data to determine water quality standards attainment and identify impaired waters. This documentation must be consistent with the state, territory, or authorized tribes applicable water quality standards implementation procedures. If the implementation procedures do not describe how water quality standards are interpreted for purposes of determining attainment status, the procedures should be revised to reference the assessment and listing methodology, at a minimum.

In recent years, most water quality agencies have followed approaches developed by the 305(b) Consistency Workgroup for interpreting data to assess water quality standards attainment/impairment status as described in the 305(b) reporting guidelines (EPA, 1997). Guidance documents for developing section 303(d) lists of impaired waters indicate that waters identified as partially or not supporting water quality standards according to the 305(b) guidelines should be included on 303(d) lists of impaired waters (EPA, 1991). One area where the 305(b) guidance and 303(d) guidance differ is the treatment of waters that are "fully supporting water quality standards, but threatened". The 305(b) guidance has a broader definition of waters fitting this category that 303(d), so it is not appropriate to assume that all threatened waters in 305(b) reports belong on 303(d) lists. Table 3-3 reflects slight modifications to the decision rules in the 305(b) guidance to simplify the reporting categories and to clarify the linkages between 303(d) lists of impaired waters and 305(b) water quality inventory reports. For simplicity, this table does not include the fully supporting, but threatened category.

An assessment methodology should take into account the balance between desired minimum data requirements from a strict scientific perspective and the practical realities of affecting the availability of information and the strength of the available evidence. For example, a state's methodology could require a minimum level of decision errors for making an attainment decision except in cases where overwhelming evidence of impairment is found. An example of overwhelming evidence would be a single sampling event showing very high metals values or dangerously low pH downstream of an abandoned mine. Another example would be allowing the results from analytical methods with high detection levels or poor sensitivity (e.g., field test kits) in cases where the results clearly suggest large exceedances of criteria. Photographs or other documentation of gross impairment may also be considered, if appropriate.

3.3.1 What statistical analyses for interpreting chemical data does the state use?

EPA acute and chronic chemical criteria for protection of aquatic life are examples of ideal standards, as defined by Barnett and O'Hagan (1997). Ideal standards include criteria set as maximum levels not to be exceeded. As defined by Barnett, ideal standards pose challenges in assessing attainment for several reasons. The standard set as a not to be exceeded chemical criterion does not address variation and uncertainty, therefore, assessing attainment implies a monitoring design that measures for the chemical throughout the entire population–all points in the waterbody continuously over time (Barnett, 1997). Any state monitoring program to collect data for interpreting attainment with water quality standards, however, involves sampling the population and estimating the characteristics of the population based on the characteristics of the sample.

Table 3-3: Interpreting Chemical Data to Assess WQS Attainment

Type of Criteria	Attaining WQS	Impaired for 305(b) and 303(d)
Acute chemical criteria for toxic pollutant for the protection of aquatic life (may be numeric criteria or interpretation of narrative)	For any one pollutant, no more than one excursion above acute criterion (EPA's criteria maximum concentration [CMC] or applicable State/Tribal criterion) within a three-year period based on grab or composite samples	More than one excursion above criterion within any three year period
Chronic chemical criteria for toxic pollutant for the protection of aquatic life (may be numeric criteria or interpretation of narrative)	For any pollutant, no more than one excursion above chronic criterion (EPA's criteria continuous concentration [CCC] or applicable State/Tribal criterion) within a three-year period based on grab or composite samples.	More than one excursion above criterion within any three year period
Acute or chronic chemical criteria for conventional pollutant (may be numeric criteria or interpretation of narrative)	For any pollutant, no more than ten percent of the samples exceed the criterion	More than ten percent of the samples exceed the criterion
Human health criteria for drinking water, fish consumption, recreation, or other human-health related uses (may be numeric criteria or interpretation of narrative)	Annual mean concentration does not exceed criterion	Annual mean concentration exceeds criterion
Human health criteria for fish and shellfish consumption (may be numeric criteria or interpretation of narrative)	Tissue levels do not exceed state/tribal risk-based levels, and/or No fish/shellfish restrictions or bans are in effect.	Tissue levels exceed state/tribal risk-based levels, and/or A fish/shellfish restriction or ban based on monitoring data is in effect

The use of sampling introduces variability and uncertainty. Some of this is due to the natural variability of the waterbody and human error associated with sample collection and analysis. A key element of the uncertainty relates to the degree of precision of the sample. A larger, well-conducted monitoring effort will yield better, more precise estimates of the true condition than a smaller or poorly run effort. It is important that a state's data quality objectives and quality assurance/quality control procedures clearly define adequate statistical and other implementation procedures to assure that all parties are aware of the minimum data set and statistical analsysis requirements to show attainment (Barnett, 1997). Figure 3-2 illustrates the effect of sample size on the confidence intervals and, therefore, the precision associated with attainment decisions.

CALM Chapter 4
State Review Draft

Using Biological Data as Indicators of Water Quality

Contents

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State Review Draft

4. Using Biological Data as Indicators of Water Quality

The objective of the Clean Water Act (CWA) is to restore and maintain the chemical, physical and biological integrity of the Nation's waters. In 1991, EPA issued a policy statement regarding the "Use of Biological Assessments and Criteria in the Water Quality Program" (USEPA, 1991a). This policy states in part:

> *"To help restore and maintain the biological integrity of the Nation's waters, it is the policy of the Environmental Protection Agency that biological surveys shall be fully integrated with toxicity and chemical-specific assessment methods in*

State water quality programs. EPA recognizes that biological surveys should be used together with whole-effluent and ambient toxicity testing, and chemical-specific analyses to assess attainment/non-attainment of designated aquatic life uses in State water quality standards. EPA also recognizes that each of these three methods can provide a valid assessment of designated aquatic life use impairment."

This chapter addresses the role of biological data in assessing attainment with applicable water quality standards and listing impaired waters. The framework described in this chapter is intended to help states and other jurisdictions better document the decision-making processes they employ to assess water quality standards attainment using biological monitoring and assessment. This framework includes the organizational structure for documenting the State's methodology for using biological assessments/biocriteria, and provides information on methodologies and approaches that can be used to support different water quality determinations.

The chapter is organized according to the necessary elements of State methodologies and the types of information state methodologies need to provide:

- How are biological data used within the context of the state's water quality standards? (Section 4.1)
- How does the state define and document the rigor and quality of its biological assessment methods? (Section 4.2)
- How are biological data interpreted to determine WQS attainment and identify impaired waters? (Section 4.3)

Section 4.4 provides information on evaluating the quality of biological indicators.

Section 4.5, *References*, lists key USEPA guidance documents that provide technical information to develop and implement effective bioassessment programs for assessing attainment of water quality standards and identification of impaired waters. All of these documents are available through EPA's web site: http//www.epa.gov/ost/biocriteria.

Throughout this chapter, hierarchies of biological methods, from Level 1 to Level 4, are suggested. Level 4 data are of the highest quality and provide a relatively high level of certainty in an assessment. In contrast, Level 1 data are produced through less rigorous approaches that present a relatively high degree of uncertainty. Without other supporting information, Level 1 data are therefore generally not recommended for use in listing or de-listing decisions.

4.1 How Does the State Use Biological Data within the Context of State Water Quality Standards?

A clear description of how biological data are used to interpret applicable water quality standards is an important element of the state's assessment methodology. States use a variety of approaches for integrating biological data in the context of applicable water quality standards. The most common approaches are:

Approach 1 ***Numeric Biocriteria***– If a State has adopted numeric biocriteria in its water quality standards for a specific water body type to protect a well-defined aquatic life use classification, then an impairment occurs when the biological condition of the water body is less than those biocriteria. (Ohio is one state using this approach.)

Approach 2 ***Narrative Biocriteria***– If a State has not adopted numeric biocriteria, but has adopted a narrative biocriterion in its water quality standards that applies to the water body, and has well-described implementation procedures that define a quantitative threshold or measurement process for meeting or exceeding the narrative criterion, then impairment occurs when bioassessments of the water body show a departure of biological condition from the acceptable range of conditions defined by the procedures (Oregon and North Carolina currently use this approach.)

Approach 3 ***Biologically-based Aquatic Life Uses***– If a State has not adopted numeric or narrative criteria, but has adopted a well-defined biologically-based designated use for a water body and also has specific biological descriptions or methods that define the biologically-based uses, then impairment occurs when a biological assessment shows that the water body is not achieving the biologically-based designated use in accordance with the State's methods and definition. (Vermont and Maine currently use this approach.)

Approach 4 ***Documented Biological Assessment Method***– If a State has not adopted numeric or narrative biocriteria, specific narrative implementation procedures, nor a well-defined biologically-based designated use, but the State has established a bioassessment procedure, then impairment/attainment is determined by the threshold established in the bioassessment methods. (Arizona and New York currently use this approach.)

If a State has adopted none of the criteria, procedures, or specific uses described above, then a program must be established to develop biologically-characterized uses and an associated bioassessment program to measure such uses. In any such case, the State's methodology should describe its plans and schedule for establishing and implementing the needed programs.

EPA recommends that States use biological assessments to refine, or tier, their aquatic life uses. A tiered approach to classification should articulate regionally relevant ecological expectations for State waters (e.g., reference conditions) and specify restoration goals for individual Water bodies (e.g., tiered designated aquatic life uses). Appropriate water quality criteria are then adopted into State standards to protect the specific designated uses. The water quality criteria and any needed implementation procedures should provide for quantifiable measurement of each specified use. This approach will better protect high quality waters, provide for more accurate evaluation of effectiveness of controls and best management practices, and enhance public confidence and participation in the water quality standards-setting process.

The States of Maine, Vermont and Ohio have well-described use classification systems in their standards (reference State documents and/or include examples from these State's standards).

Currently, the majority of states are using or preparing to use Approach 2 (i.e., they have narrative biocriteria and have either well-developed bioassessment procedures or are validating procedures and decision thresholds). Many of these states have rigorous bioassessment programs that can serve as a basis for implementing or adopting numeric biocriteria in their water quality standards. As of 1995, all but three states had either developed, or were in the process of developing, bioassessment approaches for streams. Thirty states used bioassessment to interpret aquatic life use attainment and 28 states had narrative biocriteria (USEPA, 1996a). Only a few states have numeric biological criteria in their standards (e.g., Maine, Ohio, and Florida for streams and Delaware for estuaries). EPA is updating the status of state and tribal bioassessment programs. Preliminary indications are that state and tribal program growth and sophistication has continued beyond the levels in 1995.

4.2 How Does the State Define and Document the Rigor and Quality of its Biological Assessment Approach?

Documentation of the rigor and quality of the biological data is integral to a biological assessment program. The following sections outline the elements that need to be documented: sampling and monitoring design (4.2.1); classification of water bodies (4.2..2); choice of reference conditions (4.2..3); choice of indicator assemblages (4.2..4); choice of field and laboratory protocols (4.2.5); and precision of the biological methods (4.2.6).

4.2.1 How Does the State Document Index Period or Other Temporal Conditions During Which It Collects Biological Data?

The state, in its monitoring program design, needs to clearly define its target population of Water bodies of interest. In the biological assessment program, this is typically done by water body and ecoregion type, along with selection of an index period. Because it may not be possible to adequately monitor each water body or water body type, most monitoring programs collect data from a representative sample of Water bodies in the target population (e.g., EMAP, MBSS). If the monitoring program uses a well-designed sample survey approach or a very comprehensive non-random approach (as Ohio does), the state may obtain statistically valid inferences about the condition of the target population.

The state must also document the index period (time of year and duration) used for sampling the condition of the biological community, or specify that it will sample on a year-round basis. EPA recommends establishing index periods to account for natural, seasonal changes in indicator results, and to assure that only results from similar index periods are compared in the attainment decision-making process.

The timing of sampling does not need to be oriented to the more severe or worst-case conditions; however, understanding the dynamics of how the ecosystem functions at different times enables the investigator to better interpret data from prescribed index periods. The use of an index period also allows a better concentration of sampling during a period when reference conditions have been characterized. A specified index period is used in most state bioassessment programs, although there are variations in the level of specificity.

- Level 1 information — No index period is identified and sampling can be scattered throughout the year. This approach is not recommended because it does not help to establish a reliable benchmark reflecting the natural cycles of spawning, recruitment, migration, and mortality.

- Level 2 information — A seasonal period is identified for convenience in sampling or to match existing programs. Sampling outside the index period may be done, but is usually for emergency response monitoring.

- Level 3 information — A well-documented seasonal index period(s) is identified or there is comprehensive annual (periodic sampling throughout year) coverage. Index periods are selected based on known ecology to minimize natural variability, maximize gear efficiency, and maximize the information gained on the assemblage (U.S. EPA, 1999). Reference conditions are calibrated for the index period(s).

4.2.2 How Does the State Document the Natural Classification of Water bodies?

The State should clearly document how it determines the natural variability of its biological data. Classification is useful in evaluating natural variability and distinguishing that natural variability from human induced changes. Classification of Water bodies may be based on water body type (rivers, streams, lakes, wetlands, estuaries, etc.), watershed drainage size, ecological regions, elevation, temperature, and other physical features of the landscape and/or water body. The number of classifications the state can analyze may be limited by the number of samples taken and the availability of candidate reference sites within each class. EPA recommends classifying more specifically than simply by water body type, because it is highly unlikely that the biological condition of a particular water body type would be naturally uniform throughout the entire state. States should list the classification approach(es) used, if any, for all water body types monitored.

Ecoregions have been used successfully as primary classification schemes (for example, in Ohio, see Yoder and Rankin, 1995), or as aggregates of ecoregions (for example in Florida, see Barbour et.al., 1996, and Wyoming, see Gerritsen et al., 2000). Ecoregions are areas of relative ecosystem homogeneity (or similar quality) defined by similarity of land form, soil, vegetation, hydrology, and general land use. For example, streams of a given ecoregion are more similar to one another than they will be to streams in another ecoregion. In coastal marine areas, large-scale provinces have been established that function similarly to ecoregions. These provinces are based on latitude, climate, and similarities in land form (Holland, 1990).

Ecoregions are not the only method for classifying freshwater ecosystems. Hawkins et al. (2000) point out that the amount of biotic variation related to landscape features is not large, and augmenting classifications based on local habitat features accounts for substantially more variation than the larger-scale environmental features. Some States have used other landscape factors such as elevation and rainfall to classify their Water bodies (Spindler, 1996).

State programs currently vary in their approaches to classification:

- Level 1 information – No classification of ecosystems. This approach is not recommended, because natural variability is not partitioned to improve the benchmarks for assessment.

- Level 2 information – Minimal classification limited to individual watersheds or basins. This approach may not recognize stream continuum principles where headwaters differ in function from mainstem. In estuaries and lakes, classification may apply only to portions or embayments.

- Level 3 information – Classification recognizes geographical or other similar organization. This approach is usually based on landscape features and supplemented with instream or other water body characteristics.

- Level 4 information – Classification based on a combination of landscape features and physical habitat structure of water body type. This approach provides the best classification scheme for assessment.

4.2.3 How Does the State Establish and Document Reference Conditions?

Reference conditions must be defined in order to assess a water body's ecological health and establish water quality goals. Reference conditions serve as the benchmark of biological integrity against which a water body's conditions are compared. The state's methodology needs to describe how it developed reference conditions, whether they were based on assessment of reference sites or through other means. The state's methodology may incorporate by reference its biological assessment methods and indicate which of the following levels of rigor best characterizes the state's reference conditions.

- Level 1 information — No reference condition formally established. Presence and absence of key taxa may constitute the basis for assessment. Professional opinion may be used to support assessment of attainment. This approach may be more difficult to defend, especially in listing determinations, than those relying on more formal scientific evidence.

- Level 2 information — Reference conditions pre-established by professional biologist and based on known ecology of area. A site-specific control or paired watershed approach may be selected for assessment. Regional sites are not generally used at this level.

- Level 3 information — Reference condition may be site-specific, but is normally based on watershed scale assessments. Regional reference sites have likely been developed for the relevant water body type and are the basis for assessment and monitoring.

- Level 4 information — Regional reference conditions are established for each water body class and consist of sites and/or other specified means of establishing regional expectations for assessing and monitoring each water body.

State methodologies need to clearly document how reference sites are selected and used. A reference condition can be derived from reference sites, an empirical model of expectations that may include knowledge of historical conditions, or a model extrapolated from ecological principles. Normally, actual sites that represent best attainable conditions of a water body are used. Generally, EPA recommends the use of a regional reference condition based on an aggregate of sites that allows for broader application in state water resource programs than individual, site-specific conditions (U.S. EPA, 1996a).

Where reference sites are not available (e.g., for large ecosystems such as rivers, estuaries, coastal areas, and in significantly altered systems such as urban centers and cropland areas), a disturbance gradient might be constructed to extrapolate to an appropriate reference condition (Karr and Chu, 1999). This approach requires some knowledge of both stressor gradients and biological condition gradients.

Abiotic factors are also used in selecting candidate reference sites. This is necessary to avoid circularity in defining biological characteristics that become the basis of reference conditions. Candidate reference sites are then evaluated to determine the degree of human modification which has occurred. Factors considered may include: human population density and distribution, road density, presence of land uses such as mining, logging, agriculture, urbanization, grazing, etc. This information can be from GIS data layers, maps and/or evaluations by resource managers. Candidate sites are eliminated if they have high human modification, especially to riparian zones.
Candidate sites can be derived from probabilistic sampling (*a posteriori* determination) or from targeted sites (*a priori* selection process).

Approaches to abiotic selection criteria can range from a few chemical criteria to a range of factors as discussed above. The rigor of the criteria also varies from very conservative, which restricts the number of candidate reference sites selected, to very liberal, which increases the number of candidate reference sites. Although EPA prefers a conservative approach, states may take different approaches based on their knowledge of the reference sites. EPA suggests using a conservative approach when greater uncertainty exists as to whether the candidate sites are likely to represent the highest quality waters. State methodologies need to include documentation of these decisions.

It is very important that staff biologists verify in the field the current conditions of candidate reference sites. A candidate site should be eliminated if conditions preclude its ability to serve as a reference for high quality water. A reference site may be natural, minimally impaired (somewhat natural), or best available (altered system).

In summary, when reference sites are used to establish reference conditions, state methodologies need to document how (by what criteria) the state selects reference sites and how it uses reference sites to define regional reference conditions (e.g., by combining sites in a regional reference condition, or through other approaches such as a paired watershed or upstream/downstream design).

4.2.4 What Indicator Assemblages Does the State Use in Its Assessment Approach?

State methodologies need to document both the assemblage(s) used as indicators and the level of taxonomy used to assess the indicator assemblage. Biological indicators can be separated into four principal assemblages that are used for assessment and attainment decisions: **benthic macroinvertebrates, fish, algae, and aquatic macrophytes**. Research is underway on birds and amphibians as candidate assemblages for wetlands, marshes, headwater and ephemeral streams, as well as other water body types (USEPA 2001- MAIA).

While a single assemblage may be sufficient for an attainment determination, EPA recommends the use of more than one assemblage to provide added confidence in the assessment finding.

Each assemblage serves a different function in the aquatic community, has differing habitat ranges and preferences, and may be susceptible to stress in varying manners and degrees. Several states collect and analyze more than one assemblage in their water quality assessments, although the data may be collected by different agencies within a state. The types of assemblages and taxonomic considerations being used include:

- Level 1 information — Visual observation of biota; poor taxonomic resolution.
- Level 2 information — One assemblage (usually invertebrates); adequate but consistent taxonomic resolution
- Level 3 information — Single assemblage collected and analyzed; high data quality and higher taxonomic resolution
- Level 4 information — Two or more assemblages collected and analyzed; taxonomic resolution to the lowest practical taxon (mostly genus/species)

1) <u>Benthic Macroinvertebrates</u>

The benthic macroinvertebrate assemblage inhabits the sediment or bottom substrates of Water bodies and responds to a wide array of stressors in different ways. It is often possible to determine the type of stress that has affected a macroinvertebrate community (USEPA, 1990; USEPA 1999). Because many macroinvertebrates have life cycles of a year or more and are relatively immobile, macroinvertebrate community structure is generally a function of past conditions in the specific water body. The benthic assemblage is the most common assemblage used in bioassessments for State water quality programs (USEPA 1996b).

Taxonomy – Genus/species taxonomic identification provides the most representative information on ecological relationships and best resolution in sensitivity to impairment (U.S. EPA, 1999). In the northwest, it is standard practice in bioassessments for all macroinvertebrates in the subsample to be identified to the lowest possible taxonomic level, generally genus or species (Hayslip, 1993). However, in some regions of the United States, family level identification is more commonly used and is sufficient for assessments in these regions ***(need a reference)***. The scientific determination of level of taxonomy should include a knowledge of adaptive radiation within the fauna, i.e., estimates of the number of genera and/or species per family. For example, the higher the ratio of genera to families, the less likely a family level identification approach will be adequate. Naturally depauperate systems, such as coastal, low gradient streams, or oligotrophic lakes may warrant family-level indices. In lakes and estuaries, biomass measurements are done on taxonomic groupings (e.g., family or genus) as part of bioassessments.

Whatever the level of taxonomic rigor chosen by the state, this needs to be clearly documented in the state's methodology.
A macroinvertebrate "voucher collection" for each major basin, ecoregion, site class or other appropriate study unit is highly recommended. This collection has a representative of each taxon and serves as a basin record and reference for checking identifications. A senior aquatic taxonomist should check the specimens entered into the type collection for accurate identification and if necessary send them out to recognized experts for verification. Ideally, this

collection should be housed in a museum or university. The state's protocols for establishing and maintaining a voucher collection also need to be described (or referenced) in its methodology.

2) <u>Fish</u>

Bioassessment using the fish assemblage requires that all fish species (and size classes), not just game fish, be collected. Fish are good indicators of long-term effects and broad habitat conditions because they are relatively long-lived and mobile (Karr et al., 1986). The fish assemblage also integrates various features of environmental quality, such as food and habitat availability. The physical degradation of streams can cause changes in the food web and the composition and distribution of habitats (Lonzarich, 1994). The objective of the fish assemblage portion of any protocol is to collect a representative sample of the fish assemblage by methods designed to (a) collect all except rare species in the assemblage and (b) provide a measure of the relative abundance of species in the assemblage. The use of fish assemblages in streams is more common in the eastern and mid-western United States, although some programs in other regions are investigating their utility (USEPA 1996b). For example, there have been fewer fish assemblage studies in streams and rivers of the western U.S. due to the more depauperate nature of these assemblages than other regions of the country. Also, fish diversity is naturally low in headwaters and other small streams, as well as in intermittent streams, making fish less viable indicators than other assemblages. Fish are considered important indicators in larger water body types (i.e., lakes, estuaries); however, fish assemblages have been used to a lesser extent in water quality assessments because of the mobility and sampling difficulties in these systems (EPA, 1998; U.S. EPA, 2000a).

Taxonomy – All fish species need to be identified to species level either in the field or the lab, depending upon the expertise of the field crew. As with benthic macroinvertebrates, it is important to retain voucher specimens (ideally in a museum or university) and EPA recommends that a taxonomic expert verify and make determinations on any problematic taxa. Additional information on species of interest may be obtained by recording total length and weight. In addition, fish may be examined for external anomalies.

3) <u>Periphyton or Phytoplankton</u>

Algae are primary producers and are responsive indicators of environmental change. The periphyton assemblage serves as a good biological indicator in streams and shallow areas because of its naturally high number of species and rapid response to exposure and recovery. Most algal taxa can be identified to species level by experienced biologists, and tolerance or sensitivity to specific changes in environmental conditions are known for many species (Rott, 1991; Dixit et al., 1992). Because periphyton is attached to the substrate, this assemblage integrates physical and chemical disturbances to a stream reach. However, few state environmental agencies have developed protocols for the periphyton assemblage in streams. Idaho recently proposed a method to use diatoms in assessing the biointegrity of large Idaho Rivers (IDEQ, 1999). Phytoplankton is a common assemblage used in lake (EPA, 1998) and estuary (U.S. EPA, 2000a) assessments.

Taxonomy – In general, EPA recommends identifying algae to species in rivers and wadeable streams because: (1) this will better characterize differences between assemblages that may occur at the species level and (2) there are large differences in ecological preferences among algal species within the same genus. However, substantial information can be gained by identifying algae just to the genus level. Although valuable ecological information may be lost, costs of analyses can be reduced, especially for inexperienced analysts (USEPA 1999, Chapter 6).

If implementing a new program and only an inexperienced analyst is available, identifying diatom genera in assemblages can provide valuable characterizations of biotic integrity and environmental conditions. As analysts get more experience counting, the taxonomic level of their analyses should improve. The cost of an experienced analyst counting and identifying algae to species is then not much greater than analysis to genus (USEPA 1999, Chapter 6).

For assessing lakes, EPA recommends sampling the phytoplankton assemblage and counting and identifying cells to order or genus. Simplified field and laboratory procedures are possible for measurements based on higher taxonomic levels such as division or order. Identification to species is considered supplemental at this time because it is not clear that the information gained represents a substantial improvement over higher levels of taxonomy (USEPA 1998b).

4. Aquatic Macrophytes

Aquatic macrophytes include vascular plants (grasses and forbes) and may be emergent or submergent. Vascular aquatic macrophytes are a vital resource because of their value as extensive primary producers and habitat for fish and waterfowl (U.S. EPA, 2000a). This assemblage is most important in estuaries (U.S. EPA, 2000a) and wetlands as an ecological indicator. Excessive nutrient loadings lead to prolific phytoplankton and epiphytic macroalgal growth on grasses that out-compete the macrophytes (U.S. EPA, 2000a).

Taxonomy – **need some language**

Whatever assemblage(s) are used, State methodologies need to document their rationale for the value and purpose of the assemblage(s) in assessment and attainment decisions. The scientific credibility of the assessment depends on the selection of the assemblage.

4.2.5 What are the State's Field and Laboratory Protocols for Indicator Assemblages?

Standardization of laboratory and field methods is necessary to establish the validity and reliability of biological data. Whatever assemblage is chosen, the methods for sample collection and laboratory analysis need to be fully documented. EPA has published a generic quality assurance project plan guidance for programs using community-level biological assessment in wadeable streams and rivers (see EPA, 1995). The development of standard operating procedures (SOPs) for field and laboratory methods needs to include an effective quality assurance (QA) program with quality control (QC) checks. In order to minimize bias, reduce error, and maintain a high level of data integrity, the SOPs and QA/QC plan identify the specific procedures of all aspects of the biological program.

Information on data quality objectives and quality assurance/quality control procedures is usually documented in a separate quality assurance project plan and standard operating procedures document which can be referenced in the state's general methodology. This information should be available for other parties to use as a reference in developing compatible monitoring projects.

- Level 1 information — Documentation of methods is cursory and they are not usually written as SOPs. Methods may be highly variable, relying primarily on best professional judgment.

- Level 2 information — Methods are generally well-documented, but QA/QC may be minimal. Training of biologists may be oriented only to new or inexperienced staff.

- Level 3 information — Methods are well-documented and SOPs are updated periodically. An effective QA/QC program in place. Training is provided periodically throughout the year for all staff to raise skill levels and enhance interaction and consistency.

- Level 4 information — Same as level 3, but methods cover multi-assemblages.

<u>Considerations for Macroinvertebrate Assemblage Sampling and Laboratory Analysis</u>
Habitat type – The three basic choices for sampling macroinvertebrate habitat type are: (a) artificial substrate, (b) multi-habitat, and (c) single habitat sampling. Each choice has advantages and disadvantages. Some choices are more appropriate in some regions of the country than in others. State methodologies need to describe which habitat they are sampling and why they have chosen this habitat type.

Each of the three choices for sampling aquatic organisms are commonly used throughout the US. However, minimum requirements for selecting an approach are: 1) adherence to strict quality control procedures to provide consistency and avoid sampling error; 2) a choice of a single habitat type is based on its availability and dominance as productive organism habitat (e.g., cobble in streams, kelp beds in coastal areas, or sand in estuaries); 3) a choice of a multihabitat approach selection is preferred in systems with a diversity of habitat; and 4) a choice of artificial substrates leads to sampling habitat that is natural for the system(s) under study (e.g., rock baskets in cobble streams or lakes, or multiplate Hester Dendy substrates to represent woody debris in streams). A State's methodology needs to describe which habitat type it is sampling and why it has chosen this habitat type

Gear/number of samples –
Macroinvertebrate samples are usually taken with either a Surber sampler, Hess sampler, D frame net or artificial sampler. State methodologies need to specify the gear type to be used. In addition, they need to document the specific characteristics of that gear (e.g., the standard mesh size for nets, if applicable) and the number of samples taken from the habitat type.
For riffle sampling, EPA's Rapid Bioassessment Protocols (RBPs) recommend sampling a minimum of 2 or 3 m^2 of stream bottom. The RBPs recommend compositing (combining) riffle samples into a single sample representative of the stream reach; however, replicates are taken at a proportion of the sites (usually 10% of the sites) to measure sampling precision (U.S. EPA, 1999). Others (Kerans and Karr, 1992) recommend taking replicate samples at all sites (i.e., taking more than one sample from a stream reach and keeping it separate for taxonomic identification and enumeration). Three to five replicates are commonly used at each site in many research studies (Resh and McElvary, 1993). There is still scientific debate on the appropriate number of samples per site/reach. The same approach (i.e., compositing samples with replicates for precision estimates) is recommended for lakes (EPA, 1998b) and estuaries (U.S. EPA, 2000a) (however, the gear for infaunal sampling consists of grab samplers (e.g., Ponar)). Again, State methodologies need to document (or reference) their sampling approach.

Subsampling – Bioassessment programs that are designed to support assessment and attainment decision, need timely and cost effective laboratory processing of benthos samples. Using a predetermined fraction of the field sample for identification and enumeration is called "subsampling". Subsampling has been crucial to reduction of costs and time associated with processing benthic samples. The goal of subsampling is to provide an unbiased representation of a larger sample (Barbour and Gerritsen, 1996). Subsampling procedures developed by Hilsenhoff (1987) and modified by Plafkin et al. (USEPA, 1989) have been implemented in many State programs. As an improvement to the mechanics of the technique, Caton (1991) designed a sorting tray and method that allow for rapid isolation of organisms and easy removal of all organisms and debris while eliminating investigator bias. In Rocky Mountain streams of Wyoming, a 200 organism subsample was found to be optimal in terms of information return for the investment (Gerritsen et al., 1996). Most agencies in the northwest use either a 300 or 500 organism subsample. However, proportional subsampling can be a viable alternative to fixed count subsampling, and has been advocated as more accurate in some cases (Courtemanch, 1996; Cuffney et al., 2000).

Whatever procedure and number of organisms are sub-sampled for identification, the state's methodology needs to clearly document (or reference) the approach used. Precision estimates are important to help interpret results from subsampling efforts. A low precision indicates lower confidence in the interpretation than a high precision. For instance, subsampling 100 organisms will provide lower values on taxa richness than 300 or 500 organisms because the probability of capture is less. However, knowing the precision of how taxa richness would be estimated from only 100 organisms may, in limited circumstances, still allow an agency to adequately assess the condition of a site. EPA recommends that states test the level of subsampling and establish precision measurements on their subsampling level.

Considerations for Fish Assemblage Sampling and Laboratory Analysis

Reach length or sampling area – The most recent revision to the RBPs (USEPA, 1999) describes two acceptable methods for site or reach selection. The first is a fixed distance method such as that used by Ohio EPA (150-200 meters) and Massachusetts DEP (100 meters). The second is a proportional distance method such as that used by the EPA Office of Research and Development's EMAP program (40 times the stream width). In lakes and estuaries, fish sampling will occur in the littoral zone along the shoreline, or in the pelagic areas for a specified distance or time (EPA, 1998b; U.S. EPA, 2000a).

Field methods – The RBPs recommend electrofishing as a standard sampling technique for streams and small areas (USEPA, 1993a). Single pass removal using electrofishing is sufficient to obtain a representation for biological assessments (Bauer and Burton, 1993). However, in some cases, electrofishing may not be allowed due to the presence of endangered species or may not be practical for other reasons. In these cases, other methods, such as snorkeling or using seines, are used. Snorkeling may miss some smaller, non-game species of fish and therefore is less useful for assemblage level analysis. Sampling gear used in large Water bodies such as rivers, lakes, and estuaries consists of seines, gill nets, or trawls. The method selected needs to be clearly documented.

Considerations for Periphyton and Phytoplankton Assemblage Sampling and Laboratory Analysis

Field Methods – The two major categories of field methods for periphyton differ by the type of substrate sampled (natural versus artificial). For an accurate assessment of the assemblage, samples should be collected during periods of stable in-stream flow.

For natural substrates, samples may be collected from either all available microhabitat types or from a single habitat type. The procedures for sampling from all available microhabitats have been adapted from the Kentucky and Montana protocols (Kentucky DEP, 1993; Bahls, 1993) and are reported in the latest version of the RBPs. An alternative to compositing several microhabitats is to select a single habitat type that sufficiently characterizes the study reach. The most accurate way to decrease sample variability is to collect from only one type of habitat within a reach and to composite many samples within that habitat (Rosen, 1995). If multiple habitats are sampled, the samples should be kept separate, by habitat, for analysis.

Periphyton can also be sampled by collecting from artificial substrates that are placed in aquatic habitats and colonized over a period of time. This procedure is especially useful in larger (non-wadeable) streams, rivers with no riffle areas, wetlands, and lake environments. Kentucky (Kentucky DEP, 1993), Florida (Florida DEP, 1996), and Oklahoma (Oklahoma CC, 1993) have used this technique successfully. Either surface (floating) or benthic (bottom) periphytometers are used and fitted with glass slides, glass rods, clay tiles, plexiglass plates or similar substrates that occur in the study area. The minimum requirements for periphyton investigations are as described in the Rapid Bioassessment Protocols (U.S. EPA, 1999) for streams, and for phytoplankton as described in the Lakes Bioassessment and Biocriteria Document (U.S. EPA 1998) and the Estuarine Bioassessment and Biocriteria Document (U.S. EPA 2000a).

Phytoplankton standing stock is estimated by chlorophyll *a* measurements. One approach might be three replicate samples collected at each station at one-half the Secchi depth using a Kemmerer or Van Dorn sampler (U.S. EPA, 2000a). Another approach would be to collect a depth-integrated sample through the entire photic portion of the water column. The same techniques for phytoplankton collections are applicable to lakes and reservoirs (EPA, 1998b), and estuaries and coastal marine waters (U.S. EPA, 2000a).

Laboratory Analysis – Generally, there are two types of algae that can be identified for assessment: soft algae (non-diatoms) and diatoms. Some states identify only the diatoms. For data on diatom abundance, EPA recommends counting a minimum of 300 to 500 valves or frustules and recording taxa and number counted on bench sheets. Chlorophyll a is also analyzed in conjunction with taxonomic identification. Chlorophyll is analyzed fluorometrically or spectrophotometrically following disruption of cells (by grinding) and extraction with acetone (APHA, 1992). Once again, documentation of the methods selected by the state is important.

Considerations for Macrophyte Assemblage Sampling and Laboratory Analyses

Field Methods – For large Water bodies (i.e., large rivers, lakes or reservoirs, estuaries or coastal marine areas), areal coverage and distribution of submerged aquatic macrophytes is estimated from aerial photographs, if available, and ground-truthed at the site (U.S. EPA, 2000a). The dominant taxa may be field-identified from vegetation samples collected in shallow waters. Detailed macrophyte monitoring and assessment procedures are included in USEPA (1992), Ferguson and Wood (1994), and Orth et al. (1993). Macrophyte surveys in streams and wetlands usually require site visits to identify the diversity of species and delineate the areal coverage and standing crop biomass.

Laboratory Analysis – Most identifications of macrophytes are done in the field. However, voucher collections and samples for biomass determinations are returned to the laboratory.

4.2.6 How Does the State Document the Precision of Its Biological Methods?

State methodologies need to document the ability of selected biological indicators to distinguish among human and natural influences. The value of a biological index, or indicator, is in its ability to be used reliably as a signal of environmental degradation. The ability of the indicator to discriminate differences among sites along a known gradient of disturbance should be critically examined.

The discriminatory ability of the indicator or index is determined by documenting the response of the indicator to environmental stress. The preferred way to do this is by establishing a gradient of stress based on non-biological factors such as contaminant concentrations, physical habitat quality, or land uses (Karr and Chu, 1999). Alternatively, binomial discriminatory ability can be determined by comparing biological differences among high quality reference sites and stressed sites (U.S. EPA, 1999). Engle (2000) and McCormick and Peck (2000) address discriminatory ability for estuarine and freshwater systems, respectively. The document *Evaluation Guidelines for Ecological Indicators* (U.S. EPA 2000b) and the revised Rapid Bioassessment Protocols (U.S. EPA, 1999) also address this issue.

Whatever assemblage or combination of assemblages is used, the state's methodology needs to document the value and purpose of the assemblage in assessment and attainment decisions. Fundamental requirements for a biological assessment include understanding the performance of the method (e.g., bias and precision) as well as the effects of natural variability on the method's ability to detect a gradient of environmental impairment. Biological assessments are most useful when the sample is representative of the site examined and the assemblage measured, the data are an accurate reflection of that sample, and the methods distinguish natural and measurement variability (i.e., "noise") from a true environmental effect (i.e., "signal"). These elements are already included to some extent in most state quality assurance programs.

- Level 1 information — Precision of method is low or not measured. Replicate data for estimating precision is not normally available. Ability of indicator to distinguish among human and natural influences is unknown.

- Level 2 information — Precision of method is moderate. Methods are better documented to enable more consistent sampling and higher precision. Ability of indicator to distinguish among human and natural influences has been determined based on studies conducted in other states or regions..

- Level 3 information — Precision is moderately high, maintained through rigorous methods, training, and periodic refinements or improvements to the implementation of the methods. Ability of indicator to distinguish among human and natural influences has been documented within the state, but is generally based on "impaired" and "reference sites" without a gradient of stressors/human influence..

- Level 4 information — Normally highest precision, reflective of high rigor in methods development and QA/QC, with good repeatability in assessments and a high level of confidence in analytical results. Ability of indicator(s) to distinguish among human and natural influences is quite high and based on a gradient of stressors/human influence, which may also include "impaired" and "reference sites"..

Method precision, or repeatability, indicates the level of confidence in a site characterization. Precision in a bioassessment requires consideration of variability due to both human and natural sources. Therefore, each step in the sampling and analysis process, including sampling precision, laboratory sorting precision, and taxonomic identification precision (ITFM, 1995), need to be addressed.

Bias is also an important consideration. Certain sampling gear or procedures, for example, are biased in terms of the types of biota they collect or the types of environmental conditions in which they are most efficient. It is important to understand such sources of bias and how they may interact with natural sources of variation (e.g., flow, season, geomorphology) to influence site characterization. Quality assurance programs encourage the continued documentation of variability to ensure the ability to detect long-term trends. An on-going quality assurance program is also useful for periodically re-evaluating the performance of the indicator and the adequacy of reference conditions.

Two fundamental requirements for a biological assessment are that samples be representative of the site or assemblage of interest, and that the analytical data accurately reflect the sample. Measurement of precision in these two requirements determines the level of confidence in the assessment. Precision is measured to identify errors and allow inferences to be made about the repeatability of an assessment. Once the precision of a method is known, the likelihood of replicating an assessment can be estimated and the level of confidence in an assessment can be characterized. More specific information on documenting measurement error, as well as temporal and spatial variability, is provided below.

Estimating and Documenting Measurement Error

The process of collecting and analyzing biological data has inherent sources of variability that can obscure the discriminatory ability of an indicator. It is important to estimate effects of these sources of variability to ensure that monitoring objectives are addressed satisfactorily and so that data quality and comparability can be documented (Diamond et al., 1996; MDCB, 1999). A major source of variability in biological assessments is measurement error. Measurement error is the degree to which one accurately characterizes the sampling unit or site and includes two general components: (1) natural spatial and temporal variability within the sample unit and (2) human or method errors. Natural spatial and temporal variability may lead to differences in precision or bias in an indicator that can result in inaccurate characterization of a site (see Section 4.4.2). Human or method errors include inconsistencies in sampling effort across sites, inappropriate use of sampling gear, inaccuracies in laboratory sorting and processing, and misidentified organisms. All of these errors can also result in mis-characterization of a site.

Human or method error is controlled by using standardized and comparable methods, proper training of personnel, and quality assurance procedures (EPA, 1995). Quality assurance procedures include examination of replicate field samples at some subset of the sample units (e.g., 10% of the sites) and re-examination of a proportion of samples by an independent taxonomist. For programs in which multiple field sampling crews are used, it is important to document variability in results due to personnel. Side-by-side sampling by different field crews is used to document the magnitude of this source of measurement error. Adequate training and similar experience in each crew helps ensure that this source of error is minimized.

Documenting Temporal Variability Among and Within Field Seasons

It is unlikely in a monitoring program that data can be collected simultaneously from a large number of sites. Instead, sampling may be conducted over several days, weeks, or months. For many monitoring programs, indicators are used only in a particular season, time of day, or other window of opportunity when their signals are determined to be strong, stable, and reliable, or when stressor influences are expected to be greatest. This optimal time frame, or index period, can reduce sources of error in site characterization due to temporal variability (U.S. EPA, 1999). However, because an index period can span several weeks or months in some cases, it may be important to estimate and document variability within a field season, or index period. This is best accomplished by analyzing multiple samples, collected over time, from reference sites.

Although resource constraints often limit assessments to single index periods, it is useful to understand seasonal effects on the indicator, particularly in cases involving unexpected monitoring demands, such as spills, emergency response, and time-critical decision-making. Understanding the seasonal variability, and expectations, for biological data, using candidate reference sites, could allow data to be used for studies outside the primary index period or for other programmatic needs.

Documenting Temporal Variability Across Years

Indicator responses may change over time, even when environmental conditions remain relatively stable. Changes may be due to weather, succession, population cycles or other natural inter-annual variations. Available estimates of variability across years should be examined to ensure that the indicator reflects true trends in ecological condition for characteristics that are relevant to the assessment question. To determine inter-annual stability of an indicator, EPA recommends that monitoring be conducted for several years at stable reference sites with minimal influence of stressors/pollutants.

Documenting Spatial Variability

Indicator responses to various environmental conditions must be consistent across a site class to enable reliable assessments. Locations within the reporting unit that are known to have similar ecological condition should exhibit similar indicator results. If spatial variability occurs due to natural regional differences in physiography or habitat (e.g., elevation), it may be necessary to adjust indicator expectations and/or stratify the reporting area into more homogeneous subunits.

Use of a regional reference condition, based on an aggregate of high quality sites, will account for "natural" spatial variability. This information is then used to determine the discriminatory ability of the indicator (see Section 4.4.5). Partitioning the natural variability on a spatial scale (i.e., site classification) ensures that biological response to various stressors will be similar within the site class.

4.3 How Does the State Analyze Biological Data to Determine Attainment Status and Identify Impairment?

An important step in a bioassessment program is analysis of the data to make attainment decisions, and identify impairment. This section describes the analysis of biological data (4.3.1); the multimetric approach to analyzing data (4.3.2); combining metrics and multiple discriminant analysis (4.3.3); a modeling approach using observed /expected taxa (4.3.4); and establishing thresholds for distinguishing between waters that are attaining aquatic life uses and those that are impaired (4.3.5).

To begin, States should document the two primary elements for determining impairment and aquatic use attainment status: (1) index development, and (2) threshold selection. Index development can include single or multiple metrics, discriminant models, or other predictive models of the aquatic community. Thresholds are the "criteria" above which the designated use is attained. First, the index is developed and verified on independent datasets. Then the attainment threshold needs to be established and documented. Selecting this threshold, or criterion, is perhaps the most critical element in reporting and documenting attainment status. States typically establish this threshold, and then add other thresholds to distinguish among higher (outstanding natural resource waters, excellent warmwater habitat, or excellent/good habitat, etc.) and lower assessment categories (limited resource waters, fair/poor/very poor, etc.). All thresholds, and the rationale for their selection, must be documented. More detailed discussion of the analytical approaches States need to provide in their documentation appear below.

- Level 1 information — No formal index or community-based endpoint. Assessment may be based only on presence or absence of targeted or key species. (Some citizen monitoring groups use this level.) Attainment thresholds not specified. This approach may not be sufficient for listing impaired waters.

- Level 2 information — A biological index or endpoint is established for specific Water bodies, but is likely not calibrated to water body classes or statewide application. Index is probably relevant only to a single assemblage. Watershed monitoring can be used where regional reference conditions have not been established. Attainment thresholds are based on dividing the total possible index or model score into equal parts (quarters, thirds, etc.).

- Level 3 information — A biological index, or model, has been developed and calibrated for use throughout the state or region for the various classes of a given water body type. The index is probably relevant only to a single assemblage, but may or may not be applicable among several states or tribes. Several states conduct assessments using Level 3 information (e.g., Florida, Arizona). Attainment thresholds are based on discriminant model or distribution of candidate reference sites.

- Level 4 information — Biological index(es), or model(s) for multi-assemblages is (are) developed and calibrated for use throughout the state or region. Integrated assessments using the multiple assemblages are possible, thus improving both the assessment and diagnostic aspects of the process. (Ohio and Idaho are examples of states using this approach.) Attainment thresholds are the same as level 3, except power analysis is used to determine the number of assessment categories.

4.3.1 Analyses of the Biological Data

There are numerous methods for analyzing biological indicator data to assess attainment status, including both univariate and multivariate analysis techniques. The most common method is use of a multimetric index which combines several biological variables into a single unitless index. These variables, or metrics, are characteristics of the biota that change in some predictable way with increased human influence (Barbour et al., 1995). Use of multiple metrics to assess biological conditions maximizes the information available regarding the functions and processes of aquatic communities. As discussed above, for a metric to be of value, it must be (1) ecologically relevant both to the biological assemblage or community under study and to the specified program objectives, and (2) it must be sensitive to stressors (Barbour et al., 1995). All metrics that fit these two criteria are potential metrics for consideration. Further analysis of this "universe" of metrics will likely eliminate some because of insufficient data or because the range in data is not sufficient for discrimination between natural variability and anthropogenic effects. The analysis should identify the candidate metrics that warrant further consideration (i.e., those that are most informative).

The selected metrics can be used independently or together, depending upon the state's specific program design. A pioneer in the use of multimetric indices for bioassessment, Ohio EPA has developed indices for fish and macroinvertebrate assemblages of its streams and rivers (Yoder and Rankin, 1995). A few states have developed approaches that combine biological metrics and discriminant models. (Maine DEP (Davies et al., 1993) and Oregon DEQ are examples of state agencies that have taken this approach.) States need not develop their own data analysis methods. Use of existing tools is acceptable and encouraged. The state needs to document the specific tool it will be using (i.e., a specific multimetric index, etc.) and how it will apply this tool. The state should document the level of information on the indicator index used (whether multimetric or discriminant/predictive model). A more detailed discussion of these approaches follows.

4.3.2 The Multimetric Index Approach

In multimetric analyses, several metrics are calculated and scored from low to high in a common scoring system. Scoring is needed because some metrics respond in different directions to anthropogenic stressors. For example, the abundance of tolerant organisms (density) increases as conditions degrade, while the number of intolerant taxa (richness) decrease as conditions degrade. Once the metrics have been scored using a common scale, the scores of all metrics are summed or averaged for a final index score. A multimetric index originally developed for fish assemblages in Midwest US streams (Karr, 1981; Karr et al., 1986) has been adapted to streams and rivers throughout the US and tested in lakes, reservoirs, and estuaries. Because modifications in the index may be appropriate for different regions and among water body types, a process for calibrating an index for ecological specificity is required. That process involves two primary steps: (1) selecting candidate metrics and testing for those that should become core metrics; and (2) developing an index by transforming metric values to unitless scores and aggregating as a multimetric index. Examples of generic metrics that are used in various water resource programs are described in Table 4-2. The response of these metrics along a biological gradient (Table 4-3) provides a means to assess condition to different levels of impairment.

Selection of Metrics

Examples of ecologically relevant attributes include: components of diversity, identity, composition, function, invasion by exotics, and rare and endangered species. Potential measures relevant to the ecology of the water body within the region or state should be evaluated. Representative metrics from each of 4 primary categories should be selected: (1) *richness*, which measures for diversity or variety of the assemblage; (2) *composition*, which measures for identity and dominance; (3) *tolerance*, which measures for sensitivity to perturbation; and (4) *trophic measures*, which provide information on feeding strategies and guilds. Karr and Chu (1999) suggest that measures of individual organism health (i.e., anomalies or deformities) be used to supplement other metrics. Karr has expanded this concept to include metrics that are reflective of landscape level attributes, thus providing a more comprehensive multimetric approach to ecological assessment (Karr and Chu, 1999).

Core metrics are selected following initial candidate metric screening to identify those that discriminate between "good" and "poor" quality ecological conditions. Metrics that are responsive to specific pollutants or stressors, where the response is well-characterized, are most useful as diagnostic tools. Core metrics should be selected to represent diverse aspects of structure, composition, individual health, or processes of the aquatic biota. Together they form the foundation for a sound, integrated analysis of the biotic condition to judge attainment of biological criteria or designated aquatic life uses.

Testing Metrics

As discussed earlier, the ability of a metric to discriminate between reference conditions and stressed conditions (determined by abiotic, or non-biological, judgment criteria) is crucial to selecting core metrics. Multiple metrics should be selected to provide a strong and predictable relationship with biological conditions. [ADD]

Normalizing Metrics to a Single Scale

As mentioned earlier, two basic approaches are used to develop metric expectations and scoring criteria as a basis for index development (Simon and Lyons, 1995). The two approaches are to use data from reference sites or data from sites representing a range of conditions. If reference sites are used, there needs to be a sufficient number of reference sites and samples available to define reference conditions. If data from sites representing a range of conditions (disturbance gradient) is used, the data need to reflect the entire range of abiotic influence, from minimal human influence to degraded.

Recent research has shown that transforming metric values into unitless scores is best done on a numerical scale from 100-0 (Hughes et al., 1998; U.S. EPA, 1999). The data from all sites for each metric, including reference sites, are truncated to the 95th percentile to remove outliers and extreme values from adversely influencing scoring criteria. [Note – for those metrics that tend to increase in value as the disturbance gradient increases, the 5th percentile is used.] The range from the 95th percentile to the minimum possible value is subdivided from 100-0, with 100 being maximum score. The summation of all metric scores is averaged to provide a 100 point scale for the index.

Metrics vary in their scale; they may be integers, percentages, or dimensionless numbers. Prior to developing an integrated index for assessing biological condition, it is necessary to standardize core metrics via a transformation to unitless scores. A multimetric index is a summation of the scores of the metrics and has a finite range within each stream class and/or ecoregion. This range depends on the maximum and minimum possible scores of the metrics (Barbour et al., 1996). Metrics may be given ordinal scores (most often 1, 3 or 5), corresponding to different aspects of a biological condition gradient, or may be scored as a percentage of the reference value (i.e., 0-100).

Combining Metrics into an Index

An index provides a means of integrating information from a composite of biological metrics. Aggregation of metrics simplifies management and decision making so that a single index value is used to determine whether action is needed. The common elements in the development of any analytical assessment tool are use of (1) an initial data set to develop (calibrate) the index and (2) a confirmation data set to test (validate) the index. The initial and confirmation data may be from the same set of biological data, randomly divided, or they may be from two consecutive years of biological data, used separately. All sites in each data set are identified by degradation class (e.g., reference vs. stressed). To avoid circularity, identification of reference and stressed should be made from non-biological (abiotic) information, such as quality of the riparian zone and other habitat features; presence of known discharges and nonpoint sources, extent of impervious surface in the watershed, extent of land use practices, etc.

4.3.3 Combining Metrics and Multiple Discriminant Analyses

There are a variety of approaches to combining metrics for an attainment determination. Maine DEP employs a hierarchical decision-making technique which is an example of a discriminant model that uses a variety of biological metrics. It begins with statistical models (linear discriminant analysis) to make an initial prediction of the classification of an unknown sample by comparing it to characteristics of each class identified in the baseline database (Davies et al., 1993). The output of the primary statistical model is a list of probabilities of membership for each of four groups designated as classes A, B, C, and nonattainment (NA) of Class C. Subsequent models are 2-way discriminant models to distinguish between a given class and any higher classes as one group, and any lower classes as a second group. The model uses 31 quantitative measures of community structure, including the Hilsenhoff Biotic Index, Generic Species Richness, EPT, and EP values. Monitored test sites are then assigned to one of the four classes based on the probability of that result, and uncertainty is expressed for intermediate sites. The classification can be the basis for management action if a site does not meet its designated use (one of A, B, or C) or the basis for reclassification to a higher class if the site has improved.

4.3.4 Modeling Approach Using Observed/Expected Taxa

Another approach, which is used in Oregon and by the US Forest Service, is based on an empirical (statistical) discriminant function model that predicts the aquatic macroinvertebrate fauna that would be expected to occur at a site in the absence of environmental stress (Simpson et al., 1996). A comparison of the invertebrates predicted to occur at the test sites with those actually collected provides a measure of biological impairment at the tested sites. The predicted taxa list also provides a "target" description of the invertebrate community to measure the success of restoration measures. The type of taxa predicted by the model may also provide clues as to the type of impact a sampled site is experiencing. This information can be used to facilitate further investigations and design control/restoration measures. This approach is being evaluated by EPA. States using this observed/expected approach will need to describe in their methodologies how their model was built and tested for Water bodies in the state.

4.3.5 How Does the State Establish Thresholds to Distinguish between Waters that Are Attaining their Aquatic Life Uses and Those That Are Impaired?

The purpose of a biological threshold is to establish the criterion for determining attainment or nonattainment of the aquatic system of interest. States need to carefully document their rationale for selecting thresholds, including thresholds that define gradations in quality or attainment status such as "good/fair/poor" or "full/partial attainment/nonattainment". The threshold should allow for a relatively straightforward analysis of biological (and other ecological) data against clear criteria to facilitate water quality management decisions. State decisions applying the threshold also need to be documented.

EPA recommends that the state establish its attainment threshold based on index values from a statistical distribution of candidate reference sites, or a discriminant model from a range of aquatic life conditions that include reference conditions. Estimates of variance, such as a standard deviation, as well as power analysis (Fore et al. 1996) can assist in determining how many assessment levels an index may represent. EPA recommends at least 3 assessment levels for adequate support of listing and de-listing decisions.

Three methods have been used for developing thresholds for judging attainment/nonattainment in freshwater systems:

- Discriminant model prediction (Maine DEP discriminant model)
- Reference distribution percentile (multimetric indexes and O/E model)
- Fraction of reference community (Oregon DEQ)

(1) Discriminant model prediction

The Maine DEP discriminant models predict the membership of a site in one of Maine's aquatic life use classes A, B, or C, or nonattainment (NA). Assignment to a single class must be by a probability in the submodel of 0.6 or greater. All sites are given an *a priori* aquatic life use of A, B, or C based on water body uses and administrative decisions. If the model indicates a site is a lower biological class than its legislative class, then the site is not attaining its aquatic life use (e.g., a site may be listed as class B, but the discriminant analysis assigns the biota to class C). If the model fails to assign a class by the required probability, best professional judgment is used.

(2) Reference distribution percentile

Once the selected metrics are normalized (different metrics all on the same unitless scale), they can be combined into a single index which has a range of possible scores. [Note: The selection of attainment/impairment thresholds for multimetric indices is not related to the scoring of the metrics for normalizing them.] The range of possible scores can be subdivided into categories corresponding to various levels of impairment based on the range of the index or a distribution of the population of candidate reference sites. For example, using the range of the index, a quadrisection (dividing by 4) of an index range within each stream class would provide 4 ordinal rating categories for assessment of impairment (Barbour et al., 1996).

The population of reference sites is normally used to determine the threshold that separates acceptable from unacceptable biological condition. A population statistic, such as the 25th percentile (Yoder and Rankin, 1995; DeShon, 1995; Barbour et al., 1996) or 10th percentile (Roth et al., 1997) of the reference sites is a commonly used threshold for multimetric indices. A 25th or 10th percentile is used to recognize that conditions at candidate reference sites are variable, and those at the lower end of the reference scale have a certain level of uncertainty in their quality. This does not mean that 25 percent of the candidate reference sites are impaired, but that these sites may need closer scrutiny or investigation to assess their condition. The greater the uncertainty in accurately selecting true reference sites, the higher the threshold percentile should be. In addition, precision estimates of the bioassessment methods provide a range of values in which a site condition may not be confidently assessed as either acceptable or unacceptable. In this eventuality, more investigation is warranted.

(3) Fraction of reference community

Oregon combines metrics and multivariate models to assess biological condition. In deciding to list or delist impaired waters, Oregon considers aquatic communities (primarily macroinvertebrates) to be impaired if they are found to be at 60% or less of the expected reference community for both multimetric scores and multivariate model scores. Streams with either multimetric scores or multivariate scores between 61% and 75% of expected reference communities are considered to be "streams of concern". Streams with greater than 75% of expected reference communities using either multimetric or multivariate models are considered unimpaired.

4.4 How Does the State Evaluate the Quality of the Biological Indicators used in Assessment and Attainment Decisions?

State methodologies need to document the quality of the data the state will accept for making attainment decisions based on biological measures. As discussed, an indicator must exhibit the ability to distinguish among a gradient of conditions. If an indicator is composed of multiple measurements, variability should be evaluated for each measurement as well as for the resulting indicator. EPA has produced several documents to facilitate implementing a quality assurance program and evaluating biological indicators and the data associated with the indicators, including the Quality Assurance Project Plan guidance for ecological assessments (EPA, 1995), Rapid Bioassessment Protocols (U.S. EPA, 1999), and Evaluation Guidelines for Ecological Indicators (U.S. EPA 2000b), from which much of the information in this section is derived. EPA's Office of Research and Development has also produced several relevant documents (Davis and Scott, 2000; Klemm et al., 1993; Kaufmann et al., 1999; Kaufmann and Robison, 1998; Lazorchak et al., 1998). In addition to these documents, resource-specific bioassessment documents will also be extremely helpful to understand any differences in evaluating data requirements for lakes (EPA, 1998), estuaries (U.S. EPA, 2000a), and rivers and streams (U.S. EPA, 1996; EPA, 2000a).

A hierarchy of biological methods has been identified (USEPA, 1997) that corresponds to the level of information and rigor that support assessment and listing decisions. The rigor of a method is dictated by its sample and monitoring program design, field and laboratory protocols, and indicator development and discriminatory ability. Level 4 data represent the highest quality for a data type and provide a relatively high level of certainty in an assessment. In contrast, Level 1 data represent less rigorous approaches and thus a degree of uncertainty that makes them generally inappropriate for use, without other supporting information, in listing or de-listing decisions. Data in Levels 1 through 4 vary in strengths and limitations, and, along with site-specific conditions, should be evaluated carefully for use in assessment and listing decisions.

Table 4-2 is a guide for overall evaluation of the State's programs using biological assessments for aquatic life use attainment decisions. Although some States may have different levels of information for various elements of their programs, this does not mean the State's program is necessarily deficient. Most important, the State's methodology should accurately characterize its program. More, rather than less, documentation is encouraged to assist with interpretation of the rigor and level of information employed. It is expected that by documenting this information, States may begin to recognize and fill information gaps to improve the levels of certainty associated with their attainment/impairment determinations.

Table 4-2. Hierarchy of Bioassessment Approaches for Evaluation of Aquatic Life Use Attainment. Applicable to all water body types; water body specific items noted where applicable. (Based on US EPA 1997).

Level of Info[a]	Technical Components	Spatial/Temporal Coverage[b]	Data Quality[c]
1	Visual observation of biota; poor taxonomic resolution; reference conditions not used; simple documentation. Attainment thresholds not specified.	Limited monitoring; extrapolations from other sites	Unknown or low precision and sensitivity; professional biologist not required
2	One assemblage (usually invertebrates); adequate but consistent taxonomic resolution; reference conditions pre-established by professional biologist; biotic index or narrative evaluation of historical records. Attainment thresholds based on dividing the total possible index or model score into equal parts (quarters, thirds, etc.).	Limited to a single sampling; limited sampling for site-specific studies	Low to moderate precision and sensitivity; professional biologist may provide oversight
3	Single assemblage usually the norm, but of high data quality; good taxonomic resolution; reference condition may be site-specific, or regional (e.g., composite of sites or determined from biological gradient); biotic index (interpretation may be supplemented by narrative evaluation of historical records). Attainment thresholds based on discriminant model or distribution of candidate reference sites.	Monitoring of targeted sites during a single season; may be limited sampling for site-specific studies; may include limited spatial coverage for watershed-level assessments	Moderate precision and sensitivity; professional biologist performs survey or provides training for sampling; professional biologist performs assessment.
4	Two or more assemblages, excellent taxonomic resolution; regional reference conditions used (e.g., composite of sites or determined from biological gradient); biotic index (multivariate single dimension or	Monitoring during 1-2 sampling seasons; broad coverage of sites for either site-specific or watershed	High precision and sensitivity; professional biologist performs survey and assessment

	multimetric index). Attainment thresholds same as level 3, except power analysis used to determine the number of assessment categories.	assessments; conducive to regional assessments using targeted or probabilistic design	

[a] Level of information refers to rigor of bioassessment, where 1 = lowest and 4 = highest.
[b] Data must be current and relevant to making appropriate decisions on impairment. Historical or non-current data only useful for setting reference benchmarks or impairment thresholds.

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CALM Chapter 9
State Review Draft

Integrating Multiple Types of Data to Assess WQS Attainment Status and Identify Impaired Waters

Contents

***CALM Chapter 9**
State Review Draft

9. Integrating Multiple Types of Data to Assess WQS Attainment Status and Identify Impaired Waters

Most states, territories and authorized tribes and tribes organize their water quality data and information according to the applicable designated uses about which they are making attainment/impairment decisions. They bring together multiple types of data on a variety of indicators to identify all aspects of impairment to applicable water quality standards (WQS). This information is used not only for 305(b) reporting and 303(d) listings, it supports development of appropriate controls that address the full range of water quality problems.

This chapter is organized according to general categories of beneficial designated uses: aquatic life, recreation, public water supply, fish and shellfish consumption. Each section briefly describes the types of data used in WQS attainment decisions and how these data are interpreted in the context of the applicable designated use. It also presents examples of how states, territories and authorized tribes work through situations where different data types do not indicate the same attainment decision.

The objective of the Clean Water Act is to "restore and maintain the physical, chemical, and biological integrity of the Nation's waters." To achieve this objective, states, territories and authorized tribes adopt applicable water quality standards including designated uses, narrative and numeric criteria to protect those uses, and anti-degradation policies to prevent deterioration of high quality waters. Under the Clean Water Act states, territories and authorized tribes also implement monitoring programs that allow them to report on attainment of applicable water quality standards to identify and prioritize waters not attaining standards.

Section 101(a)(2) of the CWA establishes as a national goal "water quality which provides for the protection and propagation of fish, shellfish, and wildlife, and recreation in and on the water, wherever attainable." Section 303(c)(2)(A) of the CWA requires water quality standards to protect the public health and welfare, enhance the quality of water, and serve the purposes of the Act. EPA's regulations at 40 CFR 131 interpret and implement sections 101(a) and 303(c)(2)(A) of the CWA by requiring that water quality standards provide at a minimum for the section 101(a) "fishable/swimmable" uses unless those uses have been shown to be unattainable. In designating waters, States, Territories and authorized Tribes take into consideration the use and value of water for public water supplies, protection and propagation of fish, shellfish and wildlife, recreation in and on the water, agricultural, industrial, and other purposes including navigation. In no case may waste transport or waste assimilation be adopted as a designated use for any waters of the United States.

States, Territories and authorized Tribe adopt water quality criteria to protect designated uses. Such criteria must be based on sound scientific rationale and must contain sufficient parameters or constituents to protect the designated use. Water quality criteria are established as numerical values based on 304(a) criteria, 304(a) criteria modified to reflect site specific conditions, or other scientifically defensible methods, or narrative criteria where numerical criteria cannot be determined, or to supplement numeric criteria. Narrative criteria are descriptions of the conditions necessary for a waterbody to attain its designated use, while numeric criteria are values expressed as levels, concentrations, toxicity units or other numbers deemed necessary to protect designated uses.

States, territiories and authorized tribes also adopt an antidegradation policy specifying the framework to be used in making decisions regarding changes in water quality. The intent of an antidegradation policy is to ensure that in all cases, at a minimum: (1) water quality necessary to support existing uses is maintained; (2) that where water quality is better than the minimum level necessary to support protection and propagation of fish, shellfish and wildlife, and recreation in and on the water ("fishable/swimmable"), that water quality is also maintained and protected unless, through a public process, some lowering of water quality is deemed to be necessary to allow important economic or social development to occur; and (3) where waterbodies are of exceptional recreational or ecological significance, water quality is maintained and protected.

For the purposes of identifying impaired waters and developing TMDLs pursuant to CWA Section 303(d), it is the applicable water quality standards (uses, criteria and the antidegradation policy) adopted pursuant to § 303(c) of the CWA that determine attainment or non-attainment. Under section 303(d)(1) of the CWA, States, Territories, and authorized Tribes must identify waterbodies that are not attaining applicable water quality standards, and prioritize such waterbodies for total maximum daily load (TMDL) establishment. For purposes of determining whether a waterbody is impaired and should be included on section 303(d) lists, States, Territories, and authorized Tribes are required to consider all existing and readily available data and information. This should include physical, chemical and biological data, including data on pathogens (such as bacteria and phytotoxins) as well as fish and shellfish tissue concentration data, where such data are existing and readily available. States, Territories, and authorized Tribes collect several types of monitoring data to help determine if waterbodies are attaining or maintaining applicable water quality standards. If a State, Territory, or authorized Tribe does not consider particular existing and readily available data and information in deciding which waterbodies are impaired and must be placed on the section 303(d) list, they must provide an explanation to EPA of why they did not use such data and information.

Monitoring to determine attainment of applicable water quality standards should include a multi-indicator approach addressing biological, toxicological, physical, and chemical indicators. Each type of data provides unique insights into the integrity and health of an aquatic system, as well as the ability of the public to safely recreate in such waters. Each type of data offers different strength and limitations. For example, biological assessments measure the cumulative effects of past or current impacts from multiple physical and chemical stressors. However, these assessments may be limited in their ability to predict future impacts, or identify new stresses that have not begun to be reflected in the biological community. Chemical-specific assessments evaluate and predict impacts from single pollutants, but do not capture the combined interactions of pollutants or their cumulative impacts over time. Assessment of the physical, chemical, and biological integrity of the nations waters should be based on a comprehensive suite of indicators, and include physical, chemical and toxic characteristics of water and sediment, chemical accumulations in fish tissue, a biological assessment of the aquatic community, and physical condition of habitats.

9.1 Aquatic Life Use

Section 101(a)(2) of the Clean Water Act establishes as a national goal "water quality which provides for the protection and propagation of fish, shellfish, and wildlife, and recreation in and on the water, wherever attainable." EPA's water quality standards regulations require that standards provide for these "fishable/swimmable" uses wherever attainable. Aquatic life uses, along with fish consumption uses, comprise the "fishable" uses of applicable State and authorized Tribal water quality standards.

> California's Applicable
> (Aquatic Life Related*)
> **Designated Uses**
> Agricultural Supply
> Aquaculture
> Cold Freshwater Habitat*
> Commercial and Sport Fishing*
> Estuarine Habitat*
> Fish Spawning*
> Fish Migration*
> Flood Control
> Freshwater Replenishment
> Groundwater Recharge
> Hydroelectric Power Generation
> Industrial Service Supply
> Industrial Process Supply
> Marine Habitat*
> Municipal and Domestic
> Navigation
> Non-contact Recreation
> Preservation of Biological Habitats of Special Significance*
> Rare and Endangered Species*
> Saline Water Habitat*
> Shellfish Harvesting*

Each state and authorized Tribe develops and adopts aquatic life designated uses for waters under their jurisdiction. For example, Illinois classifies nearly all waters of the state under a General Use category to "protect the State's water for aquatic life (except as provided in Section 302.213), wildlife, agricultural use, secondary contact use and most industrial uses and ensure the aesthetic quality of the State's aquatic environment. California's WQSs include at least ten categories related to aquatic life use (see text box). Vermont uses another approach, whereby the state refined its aquatic life use categories to reflect expectations for characteristics of the aquatic community in each category. It defined five categories of aquatic biota use and each category defines different expectations for the condition of aquatic macroinvertebrates and fish assemblages. For example, Class B1 waters provide that "change from the reference condition for aquatic macroinvertebrate and fish assemblages shall be limited to minor changes in the relative proportions of taxonomic and functional components; but tolerant and intolerant components shall be within the range of the reference condition."

9.1.1 Which types of data and information does the state use for assessing whether aquatic life uses are attained?

EPA encourages you to use each of the following types of data in aquatic life use assessments.

- *Biological Data* - Biological data measure actual effects of pollutants on an aquatic community. Biological assessments typically quantify the difference between reference or expected conditions of aquatic communities and those found at a specific site being evaluated. Reference conditions are the expected biological attributes (e.g., the structure, function, and condition) of the aquatic community in a particular type or class of waterbody. Chapter 4 provides more detail and references to technical documents on the use of biological data to assess WQS attainment/impairment.

- *Habitat Data* - Physical habitat loss is the single biggest factor in the loss of aquatic species. (Cite) Habitat assessments are often conducted in conjunction with biological assessments. A general habitat assessment incorporates physical attributes from microhabitat features such as substrate, velocity, and depth with waterbody morphology features such as width, sinuosity, flow or volume and macrohabitat features such as vegetation and land use. All of these features can be incorporated into an index or summary of overall habitat conditions. Typically states, territories and authorized Tribes integrate habitat assessments with biological assessments when assessing applicable water quality standards attainment. These indices are sometimes used independently to determine whether aquatic life uses are being attained. Chapter 8 provides more detail and references to technical documents about development and application of habitat indicators.

- *Toxicity Data from Water Column and Sediment* - Toxicity tests are useful for examining the effects of unknown mixtures of chemicals in surface waters. They may also be used to confirm that an observed impairment is not due to chemical or toxicity-related sources. Toxicity thresholds are expressed in terms of "toxic units" that cause toxic effects to aquatic organisms. Toxicity levels are determined by exposing aquatic organisms to water samples. To sensitive aquatic organisms, toxicity testing integrates the biological effects of most chemical stressors present, potentially giving a more accurate estimate of the actual water or sediment quality as compared to chemical concentration measurements. Even unknown toxicants are addressed during testing.

  States and tribes may have ambient water or sediment toxicity criteria in numeric (toxic units) or narrative ("free from") forms. Whole effluent toxicity (WET) testing is commonly performed at point source discharges and can be used to trigger ambient monitoring for toxicity. Chapter 6 provides more detail and references to technical documents about the use of toxicity testing as an indicator of water quality standards attainment.

- *Fish/Shellfish Tissue Data* - The "fishable" goal of the Clean Water Act means that not only can fish and shellfish thrive in a waterbody, but when caught, can also be safely eaten by humans. Fish and shellfish tissue data is an important factor in the determination of aquatic life use support. Section 9.4 provides more detail on interpretation of data related to fish and shellfish consumption.

- *Chemical and Physical Data* - Chemical and physical data address toxicants (e.g., priority pollutants and non-priority pollutants) and physical characteristics (e.g., dissolved oxygen, suspended solids, pH, and temperature) in water and sediments. Chemical and physical data provide direct information about whether specific pollutants are present in amounts that are causing or likely to cause adverse impacts to aquatic organisms.

  Pursuant to Section 304(a) of the Clean Water Act, EPA has published water quality criteria for the protection of aquatic life for 31 pollutants. States, territories and authorized Tribes use these water quality criteria as guidance in and adopting water quality criteria into their water quality standards. Chapters 3 and 5 provide more information on the use of chemical and physical data for determining water quality standards attainment.

9.1.2 How does the state interpret data from multiple sources to make WQS attainment/impairment decisions?

To address the possibility of conflicting results, EPA developed a policy on independent application of different types of data when making aquatic life use attainment/impairment decisions. This policy helps protect against dismissing valuable information when evaluating aquatic life use attainment, particularly in detecting impairment. Under EPA's policy on independent application, when different types of monitoring data are available for assessing a waterbody's aquatic life uses, an indication of impairment from any one data type (e.g., biological, chemical, toxicity) is sufficient to make a finding of impairment. The policy further elaborates that appropriate action should be taken when any one of the three types of assessment determines that the standard is not attained, and that no single assessment (i.e., biological, chemical or toxicity) can be used to override a finding of existing or potential impact of impairment bassed on another assessment. EPA's policy on independent application is based on the premise that any valid, representative data indicating an actual or projected water quality impairment must not be ignored when determining the appropriate action to be taken.

Figure 9-1 elaborates on the use of the independent application policy in aquatic life use assessments. The decision process begins in the upper left of the figure. Where a state, territory, or authorized tribe has two or more types of data that do not indicate consistent attainment status, they should determine if differences in assessment results can be attributed to artifacts of the data. Where the differences in assessment results are due to an artifact of the data, the independent application policy allows for resolving the differences by cleaning up the data. For example, this may involve consideration of analytical methods, review of the sampling techniques, and detailed assessment of the data sets.

Where detailed data analysis fails to identify artifacts of the data that explain the discrepancies, site-specific environmental conditions may be assessed (e.g., effects of water chemistry, or the ability of species to adapt over time). Three procedures that may be explored to assess whether site-specific environmental conditions explain the discrepancies include application of the water effects ratio, development of site-specific criteria, revisions to state criteria, or conducting a Use Attainability Analysis (UAA).

Table 9-1 provides three abbreviated case studies demonstrating how aquatic life use support decisions are made when different types of data provide differing findings. EPA requests that states, territories, and tribes send examples of cases where differences in assessment results cannot be attributed to either artifacts of the data or environmental factors. This will help the Agency further refine the independent applicability policy.

Policy of independent applicability *says*:

- When evaluating multiple types of data (e.g., biological, chemical) presume the water is impaired when any one type of data indicates a water quality standard is not attained
- Re-evaluate all of the data sets to resolve discrepancies. In some cases this may lead to modification of applicable water quality standards to account for site specific information.

Policy of independent applicability *does not say*:

- Always assume that a single sample result showing impairment outweighs all other data showing attainment
- Accept all differences in data findings at face value
- Ignore data quality and site-specific environmental factors.

CALM Chapter 10
State Review Draft

Monitoring to Assess Attainment with Water Quality Standards

Contents

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10. Monitoring to Assess Attainment with Water Quality Standards

This chapter provides a brief overview of EPA's basic expectations for state water quality monitoring programs. A more complete description is provided in Appendix A, *Elements of a State Ambient Water Quality Monitoring Program*. State water quality agencies address additional water resource and water quality management objectives in state monitoring programs, beyond those that are covered here. This chapter, like the rest of this document, focuses on monitoring ambient water quality to assess attainment with water quality standards. Following this overview, subsequent chapters in Part B provide more detailed guidance on selecting indicators of water quality (Chapter 12) and monitoring design scenarios (Chapter 13).

10.1 What are the State's Monitoring Objectives to Satisfy CWA Requirements for Water Quality Assessment, Reporting and Listing under Sections 303(d) and 305(b)?

Chapter 2 describes the water quality assessment and reporting objectives of the Clean Water Act. In order to meet these objectives, a state's monitoring design must be based on sound science and must be able to:

- Assess 100 percent of the waters of the state using an appropriate combination of targeted and statistically-based monitoring designs (e.g., probabilistic designs) every 5 years

- Include all water body types (e.g., wadeable streams, lakes, ponds, reservoirs, estuaries, wetlands, coastal waters, rivers) over time so that eventually all are included in each 5 year cycle

- Determine water quality standards attainment status for assessed waters for all applicable uses

- Identify waters not attaining water quality standards at a scale appropriate for developing and implementing controls to restore waters

- Identify the pollutants or pollution causing non-attainment and the likely sources of those pollutants or pollution.

10.2 How Does the State Currently Collect Water Quality Data and What Monitoring Objectives Do the Data Satisfy?

After reviewing its monitoring objectives, that state should inventory current monitoring activities. The inventory should include activities performed by various agencies within the state government, agencies in neighboring states, interstate commissions, tribal government, federal and local government agencies, academic organizations and volunteer citizen monitoring groups. The state should also document the sources of supplemental information such as land use coverages, remote sensing images and predictive models. Some states are using a state Monitoring Council to conduct this inventory.

The inventory of current monitoring activities is a valuable tool for identifying which monitoring objectives are satisfied by current activities and which are not. This may help a state develop strategies for filling monitoring gaps or redesigning aspects of its monitoring program; help states identify existing resources that may be under utilized; and identify partners that may be willing to modify their current monitoring activities to collect data that is more useful to the state's objectives. Again those states forming monitoring councils are using them to facilitate this analysis.

The following list of monitoring activities provides a glimpse of some of the current sources of water quality data used by states.

- **State's fixed station river network** with stations that are sampled either on an annual basis, during the rotating basin's schedule, or intermittently as projects and other assessment needs determine. Stations tend to be in populated areas of the state, and are generally on 3rd and higher order streams, including deep rivers. Biological, chemical and physical data are collected as resources permit. Depending on state resources, the fixed station network can have a high number of biological sites (with in-house staff performing sampling and analysis of macroinvertebrates & fish), but may not have as many chemical sampling stations (for which laboratory analysis costs may restrict the number of metals, nutrients, and organics analyses).

    - **USGS fixed station river network** (gaging stations) is a part of the state's fixed station network, with sites that have been monitored constantly or intermittently for over 20 years. Water quality parameters monitored at the sites may include flow, nutrients, heavy metals and general water quality data. Monitoring frequency ranges from monthly, quarterly or biweekly basis depending on the site's location. Stations are generally located on higher order streams and rivers, though some sites may be wadeable. Instream data may be collected on dry or wet weather days, depending on when the collection day falls.

- **Special projects/initiatives**. For the duration of the initiative, sites are more highly concentrated and sampled at a higher frequency than would otherwise be possible without the special attention and funding. Usually initiatives are on a watershed or coastal area basis, so there can be a mix of stream orders and freshwater/estuarine waters. Biological, chemical, and physical data may be collected. There may be both dry and wet weather-targeted monitoring. National Estuary Program waters are included in this category.

- **Designated bathing beaches** in the state are sampled for pathogen indicators during swimming season by state or local authorities. The sampling frequency ranges from monthly to weekly.

- **Lakes** in the state may be sampled from late spring to late fall. To supplement state monitoring in lakes, volunteer monitoring programs frequently collect basic surface water quality data at a weekly or biweekly frequency for lakes and ponds. Some data is collected during wet weather, but most is collected during dry weather. Parameters generally include air and water temperature, dissolved oxygen, secchi depth, chlorophyll at near-surface or by a "tubing core" above the thermocline. The state samples at the deep hole, and may supplement by sampling a few other sites along transects in a large lake. Volunteer monitoring programs select the sites that each volunteer consistently samples. Depending on the group, sample sites may be near-shore off docks or in the middle of the lake, or over the deep hole.

- **Shellfish sanitation program**. The state's shellfish sanitation program conducts fecal coliform sampling in approved and conditionally approved shellfishing areas of the state's coastal waters. In some areas citizens collect fecal coliform data of their own in order to supplement the frequency and the density of the shellfish program.

- **Fish tissue sampling for public health information**. The state analyzes fish tissue periodically to determine if public health advisories should be set, amended or removed. The state generally selects waters with high use and fish species that are likely to pose health risks if contaminated. Funding for laboratory support generally determines how many samples can be analyzed each year.

- **Ecological Monitoring and Assessment Program and Regional-EMAP projects**. These are another type of special project in which EPA and the states collaborate on a monitoring design to address a specific objective. Monitoring objectives have included assessment of contaminants in fish tissue in lakes, aquatic life use support status in wadeable rivers and streams and biological assessment of estuaries and coastal waters. These projects always use a stratified random design for selecting a sampling site to monitor from the population of potential sites so that the sample results may be used to describe conditions throughout the population with documented statistical confidence. The duration of EPA's involvement in the project typically is limited to a few years. Depending on the project, biological, chemical and physical data are collected and the results are used to describe conditions about a population of water body types and/or group of organisms within the state or other geographic area.

- **USGS National Water Quality Assessment (NAWQA) program.** In 1991, the USGS initiated a series of watershed studies around the country to evaluate the occurrence and distribution of contaminants in relation to major contaminant sources and background conditions (USGS, 1995). This program included water-column studies, bed sediment and tissue studies and ecological studies. They are a source of water quality data to those states that have a watershed that is part of NAWQA. Generally, USGS data and the detailed watershed assessment reports are available 5-10 years after the initial data collection takes place.

- **NRCS, USFWS, NOAA & University studies** provide data that is useful for making determinations of conditions or causes and sources of problems. The level of participation varies among states.

- **Permit programs such as NPDES, stormwater, wetlands, etc.** Permit information is not directly used for determining instream conditions, but can be used in modeling or in determining sources of problems.

The list provided above illustrates the wide range of monitoring activities that may be occurring in a state. It is not a complete list, nor do the descriptions represent a complete inventory. A complete inventory should include the following elements in its description of each monitoring activity:

- Name and point of contact
- Programmatic objectives
- Data quality objectives
- Design strategy (e.g., fixed station, random)
- Target population (e.g., waters covered by design)
- Water quality indicators monitored
- Frequency of monitoring by indicator
- Locations of monitoring stations (latitude and longitude)
- Quality assurance project plan (review for consistency with state plan)
- Data management and metadata documentation
- Dates on record

- Significant changes in monitoring since inception
- Please list more as appropriate

Upon reviewing the inventory of monitoring activities, the state should describe the extent that its monitoring objectives are satisfied by these existing monitoring activities. This allows the state to clearly identify any gaps. Following are some examples of common gaps in state monitoring activities.

- Rural and Remote Areas – The state concentrates usually on areas which have the higher population levels, and does not have a program to systematically feed portions of the low priority areas into the annual monitoring activities. Therefore, assessments of water bodies in these areas can not be made based on monitoring data.

- Specific types of waterbodies Rivers and streams and lakes are most commonly assessed water body types. Much less monitoring is typically conducted in estuaries, coastal waters or groundwater. Wetlands are rarely assessed. Headwaters and other emphemeral waters are usually not assessed due to intermittent flows or difficult accessibility. In some cases (i.e., wetlands, ephemeral and intermittent waters), the state and EPA have not developed biological criteria and assessment protocols that the state feels are useable for aquatic life use determinations in certain types of waters.

- Areas Outside the Range of Targeted Sample Sites – This overlaps with less populated areas. But within populated areas, the intensity of the network may not be enough to provide coverage. There may be no scientific basis for extrapolating results from one area to surrounding areas.

- All Applicable Designated Uses – All waters need to be inventoried and assessed for fishable, swimmable and other applicable designated uses. The state monitors all designated bathing beaches, but the Clean Water Act provides that all waters, even with lower levels of human contact, need to be assessed. Fish consumption is not assessed for all waters, and it involves high laboratory analysis costs. Aquatic Life Use is assessed for wadeable streams using biological data, but large rivers, estuaries, and many lakes/ponds either remain unassessed, or are presumed to be assessed based upon dissolved oxygen or other physical/chemical data. In some cases (i.e., wetlands, ephemeral and intermittent waters), the state and EPA have not developed biological criteria and assessment protocols that the state feels are useable for aquatic life use determinations in certain types of waters.

- Waters Accessible Only From Private Land – Due to the efforts needed to obtain permission to cross private land, the state may not sample waters that pose this type of problem. Generally, if access is denied upon request, the site is not sampled. The state agency does not have provisions for gaining access for sampling waters on private land without each landowner's express consent.

10.3 How will the State Enhance Existing Efforts to Meet Monitoring Objectives?

The state needs to document the process it undertook to inventory monitoring activities and identify gaps. This is an important part of the development of the state monitoring strategy called for in the *Elements of an Adequate State Ambient Water Monitoring Program* (see Appendix A). The state strategy needs to describe how monitoring activities will satisfy all of its monitoring objectives. This will include a description of efforts to enhance, supplement or even restructure its monitoring program. This section reviews the key elements of the state's strategy for monitoring to meet the objectives of Clean Water Act sections 303(d) and 305(b) that were listed in section 10.1.

EPA recognizes that state monitoring programs are at different stages of progress toward satisfying all of the monitoring objectives. Full implementation may take as few as two years or as many as ten. Key components of the monitoring strategy are a schedule of milestones and an analysis of resources needed to achieve full implementation.

Define Monitoring Objectives. The previous two sections in this chapter addressed programmatic monitoring objectives and the outputs of current moniitoring activities. Another key aspect of this step is articulation of data quality objectives (DQO) or quantitative expectations of a state's monitoring program. These quantitative expectations are critical to the design of monitoring activities. For example, Appendix A indicates that a state's monitoring design should be able to estimate the percentage of waters that are attaining water quality standards or impaired to within ± 10 percent at a 90 percent confidence level. Some states are developing implementation policies for interpreting water quality standards that include quantitative factors regarding the acceptable error rates associated with attainment decisions. Details of the DQO process are presented in *EPA Guidance on the Data Quality Objectives Process* (EPA, 2000).

Identify Indicators of Water Quality. Indicators of water quality is another term for water quality parameters, chemicals or characteristics that the state measures to assess water quality attainment status. Indicators includes physical, chemical or biological measures. Selection of indicators is an important step because it has a significant role on the monitoring design and number of samples that need to be collected to achieve the data quality objectives. Its important programatically because of the information indicators provide regarding the nature of impairments and the likely causes and sources of water quality degradation. Chapter 12 presents more information on selection of water quality indicators.

Develop Preliminary Monitoring Design. Designing a monitoring program is an iterative process of balancing monitoring objectives and data quality objectives with technical and resource constraints. The initial design reflects the initial monitoring objectives. Steps involved in this phase of the design include defining the population and subpopulations of waters included in the design. This is also referred to as developing the sampling frame. It may involve generating a list of all lakes, defining the scale rivers and streams a subdividing them according to Strahler order, identifying all public water supply source waters, and geolocating all delineated wetlands. The preliminary design describes how sampling locations are selected. Selecting sampling locations may include use of combination of monitoring designs which are described in Chapter 13.

Determine Sample Size and Evaluate Costs. The optimal sample size for the monitoring design is determined. Tradeoffs between less precise, less expensive designs (e.g., fewer sample locations or fewer indicators monitored at more sample locations) and more precise, more expensive designs (e.g., more sample locations or more indicators monitored at fewer sample locations) may be required. The monitoring design should satisfy all constraints, including decision or estimation performance, schedule, cost, equipment, facilities, and personnel.

The cost estimate should include labor costs for the various activities to be undertaken for the design and implementation of monitoring activities (e.g., planning and preparation, mobilization, travel, equipment, supplies, sample collection and analysis, data analysis, data management and reporting).

If none of the designs are feasible within the resource constraints (i.e., performance requirements cannot be satisfied within all constraints), then corrective actions need to be negotiated:

- Consider other, perhaps more sophisticated but less costly, sampling designs.
- Relax the performance requirements (e.g., increase the probability of decision error by reducing the level of confidence).
- Reduce the precision of the decision by increasing the width of the confidence or estimation interval.
- Relax one or more constraints (e.g., increase the budget, reduce the number of indicators measured, change the time frame for implementation).
- Re-evaluate certain aspects of the sampling objectives (e.g., increase the scale of decision making, reduce the number of sub-populations that require separate estimates, or consider surrogate or indicator measurements).

Select the Monitoring Design. Select the best design based on consideration of the advantages, disadvantages, and trade-offs among the monitoring designs that satisfy the performance requirements and technical and resource constraints. Practical issues considered typically include the potential for schedule or budget risks, safety or health risks to monitoring personnel, or other pertinent concern.

Prepare a Quality Assurance Project Plan (QAPP) for Monitoring Activities. The plan(s) provide details of how the monitoring activities will be executed, contingency plans for unlikely or unexpected events, sampling and analysis protocols, and the QA/QC protocols necessary to detect and correct problems that may arise and to ensure high quality data and results.

10.4 References

U.S. EPA 2001. *Elements of an Adequate State Ambient Water Monitoring Program* (draft)

U.S. EPA 2000. *EPA Guidance on the Data Quality Objectives Process* (EPA/600/R-96/055).

U.S.G.S. 1995. *Design of the National Water-Quality Assessment Program: Occurrence and Distribution of Water Quality Conditions.* U.S. Geological Survey Circular 1112

Olsen, Anthony. 2000. *Aquatic Monitoring: A General Description of Probability Based Survey Sampling and Answers to Frequently Asked Questions.* EMAP Program Paper, Anthony Olsen, April 10, 2000

CALM Chapter 11
State Review Draft

Selecting Metrics or Indicators of Water Quality Standards Attainment

Contents

CALM Chapter 11
State Review Draft

11. Selecting Metrics or Indicators of Water Quality Standards Attainment

Chapter 11 provides recommendations for selection of potential baseline indicators for each generic designated use classification based on the report of the Intergovernmental Task Force on Monitoring Water Quality (ITFM, 1995). The recommendations can serve as a starting point for states as they tailor selection of indicators according to their water quality standards and data quality objectives. This chapter also presents considerations for identifying additional or supplemental indicators that could be included in follow-up or site-specific monitoring.

A first activity a state may undertake in designing a water quality monitoring framework is identifying the appropriate indicators and their endpoints for making attainment/impairment decisions. The state's water quality standards drive this selection process. The state must have a mechanism for interpreting data on water quality indicators within the context of its standards, including designated uses, narrative or numeric criteria, or antidegradation policies. Other factors that influence a state's selection of indicators are related to the sampling effort such as the cost of collecting and analyzing samples, the variability of the indicator in the environment and level of precision desired by decision makers, and the sampling frequency required to meet the data quality objectives (EPA, 1991).

Indicators logically would be organized around the specific designated uses assigned to specific water bodies. Indicators could include chemicals, biological indices, fish tissue action levels, risk assessment levels, or other measures if used to assess designated uses of a water body. The monitoring design framework recognizes that selection of indicators is part of an iterative process that also includes establishing appropriate monitoring sites or locations. Consequently, the process of selecting appropriate indicators can proceed in concert with development of the actual sampling design. The goal of the monitoring design framework is to select appropriate indicators suitable for and compatible with the sampling design so that a representative assessment of the waters of the State can be conducted.

Limited resources will affect the actions and decisions for many water quality monitoring programs. Optimal use of these resources may dictate, for example, that a state establish a tiered or staged approach in their monitoring design. This approach may involve an initial round of monitoring for a baseline set of indicators. A subsequent round(s) of targeted monitoring would follow for additional pollutants of concern.

11.1 What Indicators of Water Quality (e.g., Physical, Chemical, Biological) does the State use as Baseline or Core Measures State-wide?

The objective in developing a baseline or core set of indicators for each designated use is not to limit monitoring programs to core indicators. Rather, the purpose is to identify a sound baseline for water quality assessment decisions. The core set of indicators includes physical, chemical, and biological measures of a water body. These indicators are appropriate measures of the ability of a water body to support its intended uses regardless of the degree of disturbance in the surrounding land use and watershed. The use of core indicators provides a scientifically valid foundation for consistent, practical, and cost effective water quality assessments at the state-wide level.

The Intergovernmental Task Force on Monitoring Water Quality identified potential indicators for describing water quality and presented rationale for their use in water quality monitoring programs for meeting water quality management objectives (ITFM, 1995). Categories of indicators included: biological response and exposure; chemical response and exposure; physical habitat; and, watershed-level stressors. The ITFM provided a general ranking of the indicators as high, medium and low for purposes of describing the extent with which water resources support the uses designated under state water quality standards. The ITFM also stated that the appropriateness of an indicator for any given monitoring program would depend on the selection criteria, water-body type and management objectives.

Using the ITFM recommendations for water quality indicators as a starting point, Table 11-1 presents baseline or core indicators and supplemental indicators for water quality monitoring purposes. Core indicators are considered indicators most important for providing a measure of water quality for general designated uses. Designated uses include aquatic life, recreation, public water supply, and fish and shellfish consumption. Core indicators could be used for initial water quality assessments and would be applied at both the state-wide and watershed scale. The core set of indicators should be supplemented with additional indicators based on the characteristics of the watershed, designated uses, and potential stressors (point and non-point sources) influencing the water body. Supplemental indicators might be used for follow-up monitoring to target the causes of water quality impairment or be included in the initial monitoring effort at a statewide, watershed or water body scale.

Table 11-1. Water Quality Indicators for General Designated Categories

	Aquatic Life	Recreation	Drinking Water	Fish Consumption
Baseline or Core Indicators	• Condition of biological communities (EPA recommends the use of at least two assemblages) • Dissolved oxygen • Temperature • Conductivity • pH • Habitat assessment • Flow	• Fecal indicators (E. Coli, enterococci) • Nuisance plant growth • Flow	• Odor/taste • Pathogens • pH • Salinity • Sediments • Flow	• Pathogens • Mercury • Chlordane • DDT • PCB
Potential Supplemental Indicators	• Toxicity • Hazardous chemicals in water column or sediment • Health of individual organisms	• Nutrients • Hazardous chemicals • Aesthetics	• Algae • Hazardous chemicals	• Other hazardous bioaccumulative chemicals

11.2 How does the State Select Supplemental Indicators?

In addition to the core indicators listed in Table 11-1, supplemental indicators may be appropriate and should be included in the monitoring design framework as needed. This is particularly important for listing impaired waters needing TMDLs under section 303(d) of the Clean Water Act. Before a TMDL can be calculated, the pollutant or pollutants causing the impairment must be identified. It is also important for removing waters from the 303(d) list. If water quality monitoring shows attainment with the criteria for the pollutant for which the water was listed, the water may be delisted.

When selecting supplemental indicators, states should consider conditions which have a potential to cause or contribute to non-attainment of applicable water quality standards. For example, are there sources in the watershed that separately or collectively might contribute pollutants in amounts or combinations that could cause an exceedance of a water quality criterion, create toxic conditions, or accumulate in sediment or fish tissue? The following discussion presents basic considerations that may guide the process for determining the need for supplemental indicators for a monitoring design framework. Principal considerations include: current and historical point sources, non-point sources, geology/hydrology, and land use patterns. Other factors may include suspected pervasive pollutants like those transported by atmospheric processes or emerging pollutant concerns that the state might want to screen.

11.2.1 Point sources in the watershed

Point sources in the watershed may contribute pollutants that cause or contribute to non-attainment with water quality standards. Information about the type of facility and nature of discharges (e.g., process water or storm water) contributes to an understanding of potential pollutants of concern. Information about discharge characteristics should be available through permit applications and discharge monitoring reports. Many permittees are required to submit the results of a complete priority pollutant scan with their initial permit application and subsequent renewals. The permittee's file should also include compliance history information and wasteload allocation data and analyses. It is important to consider the potential cumulative impacts to a water body resulting from multiple sources of pollutants. Unless a TMDL has been completed for the water body, it is common for individual permits to be issued without consideration of other sources of regulated pollutants.

Point sources may have existed historically but may no longer be evident. Historical sources may have contributed pollutants or contaminants to environment which still are tied up within sediments in the water column or in soils at the site.

11.2.2 Nonpoint sources in the watershed

Non-point sources generally are related to land use practices. Land use (e.g., rural, agricultural, urban, industrial) often dictates what indicators may be most suitable for water quality monitoring. Current and historic land use practices in the watershed should be identified. Information about agricultural and animal husbandry practices, pesticide usage, urban/impervious surfaces, land management practices (e.g., forestry, mining), and best management practice (BMP) that would mitigate pollutant impacts should be reviewed. Past land use practices may be very different than current practices and residual pollutants may be present in soils or sediments within the water column. A discussion of pollutants associated with different land use types and sources is presented in the third edition of *Guidance for Assessing Chemical Contaminant Data for Use In Fish Advisories (EPA, 1998)* (see http://www.epa.gov/ost/fish) and in the ITFM Technical Appendix L *Ground Water Quality Monitoring Framework* (ITFM, 1997). Table 4-3 of *Guidance for Assessing Chemical Contaminant Data for Use In Fish Advisories (EPA, 1998)*, lists chemical contaminants by watershed type which bioaccumulate in fish tissue.

11.2.3 Geology and hydrology

Geologic and hydrologic processes within a watershed and upstream watersheds generally establish water quality conditions within the watershed. In some cases, weathering and transport processes for certain geologic areas may result in increased concentrations of metals, particularly arsenic, cadmium, mercury, and selenium. Increased concentrations may be found both in the water column and in underlying sediments (*Guidance for Assessing Chemical Contaminant Data for Use In Fish Advisories, EPA, 1998*). Disturbances from land use practices may aggravate already marginal natural water quality conditions.

11.3 How do Core and Supplemental Indicators Fit into the Monitoring Design?

Use of core and supplemental indicators may be integrated into a monitoring design framework in several general ways. For purposes of illustrating the use of core and supplemental indicators within a monitoring design framework, two simple frameworks are presented: integrated monitoring and staged monitoring. Chapters 13 and 14 discuss monitoring design frameworks and their advantages and disadvantages in more detail.

11.3.1 Staged implementation of core and supplemental indicators

An initial round of monitoring is conducted. Sample are collected for core indicators as appropriate for the uses assigned to the waters from which samples are collected. This round of monitoring is intended to assess the attainment/impairment status of waters represented by the sampling design. If a broad scale, probability-based design is used for the assessment, then data collected during the initial round of monitoring are representative of all waters within the population from which samples were selected. These data provide a representation of the properties of waters which attain water quality standards or criteria as well as of those waters which are impaired. If a finer scale, targeted design is used, then these data represent the properties of the specific water bodies or segments of water bodies sampled and tested.

A second round of monitoring focuses on waters identified as impaired or having the potential to be impaired (based on analysis of ancillary data collected to help identify attributes of impaired waters). This round of monitoring is focused on specific waters or water bodies, so supplemental indicators are selected based on consideration of watershed characteristics and applicable water quality standards. During the second round of monitoring, these supplemental indicators are monitored at the sampling sites in addition to the core indicators. Further rounds of monitoring using supplemental and core indicators may be conducted, as appropriate, to better identify/delimit impaired waters, specific problems, and potential stressors or sources.

11.3.2 Integrated implementation of core and supplemental indicators

When the sampling framework is developed (either state-wide or watershed specific or water body segment limited), appropriate core and supplemental indicators are identified and included in the monitoring design. A monitoring design always includes the core indicators appropriate for the designated uses. A monitoring design includes supplemental indicators based on consideration of watershed characteristics influencing each sampling location. A single round of monitoring is conducted of all sampling stations specified in the monitoring design. Data from the monitoring event are used to assess the attainment/impairment status of waters represented by the sampling design.

11.4 References

ITFM, 1995. *Technical Appendix D, Indicators for Meeting Management Objectives– Summary and Rationale Matrices*, The Strategy for Improving Water-Quality Monitoring in the United States. Intergovenmental Task Force on Monitoring Water Quality, 1995.

U.S. EPA 1998. *Guidance for Assessing Chemical Contaminant Data for Use In Fish Advisories (EPA, 1998)* (see http://www.epa.gov/ost/fish)

ITFM, 1995. *Technical Appendix L, Ground Water Quality Monitoring Framework* The

Strategy for Improving Water-Quality Monitoring in the United States. Intergovenmental Task Force on Monitoring Water Quality, 1995.

U.S. EPA 1991. *Monitoring Guidelines to Evaluate Effects of Forestry Activities on Streams in the Pacific Northwest and Alaska* EPA Region 10, May 1991 (EPA/910/9-91-001)

From: Keri Cole
To: Valerie Connor
Date: 6/25/01 3:04PM
Subject: 303d

Hi Valerie
Attached are our responses to your questions for Region 9. We also attached our procedure memo for your reference (based on Reg 5 procedures).

FYI - I am the led on this for our region, so perhaps you could add me to your email list. However, I will be out of the office beginning tomorrow June 26th through Friday July 6th. Jimmy Smith jsmith@rb9.swrcb.ca.gov in our office will be the contact in my absence.

Thanks.

Keri Cole, P.E.
Water Resource Control Engineer
San Diego RWQCB
9771 Clairemont Mesa Blvd., Suite A
San Diego, CA 92124
(858) 467-2798
colek@rb9.swrcb.ca.gov

CC: Deborah Jayne; James Smith

Questions to assess current status of TMDL listing activities:

1. How much information was submitted to your Region for evaluation for the upcoming 2002 TMDL submittal? (We don't need a precise count, but a feel for how much information you are reviewing. For example, 4 boxes of reports or about 50 individual submittals).

Region 9 has approximately 40 different submittals (in-house and external) of data to review. These include: Planning studies, Survey Assessments, Monitoring Reports, NPDES Compliance Data, Stormwater Permit Compliance Reports, Health Care Agency Beach Closures, City of San Diego Monitoring Reports, USGS Monitoring, Discharge Monitoring Reports, Citizen-submitted Packages, modeling studies, photographs, Benthic Community Assessments, Toxic Substance Monitoring Program and other miscellaneous sources of data. Public solicitation notices were mailed and advertised in local newspapers on 7 Mar 01 and Public Workshops were held on 4 April 01 and 3 May 01. We are only reviewing data generated since July 1997 and received in our office by 15 May 01.

2. Can you make any estimates about the number of new listings or delistings you are anticipating? (Your best "guesstimate" is a sufficient answer.)

Our best guesstimate (emphasizing guess) is 5 - 8 new listings and no delistings.

3. What process are you using to evaluate new information? (If you have a written summary of the process, can you forward a copy?)

Please see attached file: Region 9's 2002 CWA Section 303(d). This model is based upon the listing criteria as delineated by Joe Karkoski (R5WQCB).

4. What type of data quality evaluations are you conducting?

QA \ QC ? We will be relying on source QA/QC evaluations where applicable. We will also be verifying lab certifications and reviewing submittal of QA/QC information. If not available, the source, type and quantity of the data will be reviewed.

5. Are you compiling all data in some sort of database?

Initially, we have created an excel database to catalogue all incoming data for waterbody affected, narrative location, document title, date received, dates of sampling, and contact person. Eventually, all data will be input to the Statewide (SWRCB) Geo Water Body System Database (GeoWBS).

6. Are you preparing water body fact sheets or some other written summary for each listing?

Water body fact sheets are being prepared and are part of the attached file: Region 9's 2002 CWA Section 303(d). Again, this is modeled after the efforts of Joe Karkoski (R5WQCB).

7. Where are you at in the process of evaluating new information? (Your best "guesstimate" is a sufficient answer.)

We have only recently developed our internal guidelines (see attached) and are still editing this document. Beginning 25 June, individual staff members will start in-depth review of the data, determine which data can be used and make recommendations for list additions or removals. We plan to have draft recommendations by early August.

8. What criteria or considerations are you using to decide whether to list a water body?

Please see attached document for specifics. In general, a water body will be listed if there is beneficial use impairment based upon evaluation of chemical, physical, or biological conditions. Data will be compared against the water quality standards in the R9 Basin Plan and in appropriate State and Federal Regulations. Health Advisory postings and contaminate levels in consumable fish and shellfish will also be compared against regulatory standards. We have no minimum data requirements or a specific frequency of exceedances, but will rely upon a weight of evidence approach to listing.

9. What criteria or considerations are you using to determine priorities for listings?

Priority rankings will be based upon water body significance, degree of impairment, existence of other efforts in the waterbody to restore beneficial uses, potential for beneficial use recovery, degree of public concern, and the availability of funding and data. Please see attached file for further clarification.

10. What is your schedule for evaluating information? (This should include any staff reports, public participation steps or Board meetings and when you plan to submit information to State Board.)

25 June	Data distributed to staff for in-depth review and evaluation
early Aug	Complete internal draft recommendations for listing / delisting
mid Aug	Post Draft listing update for public scrutiny
mid Aug	Conduct Public Workshop?
Sept-Oct	End of 30-day public review / comment period. Respond to public comments
Oct Mtg.	Finalize recommendations, Present listing / delisting to R9 Board
end of Oct	Present Recommendations to SWRCB

11. What role will your Board play? Will your Board formally approve the list or will it be presented as an information item?

We anticipate the recommendations will be presented to the Board as an informational item at the October Board Meeting. The R9 Board is not expected to take a formal action on the recommended listings.

12. The TMDL roundtable had asked DWQ staff to arrange 11 focus groups to meet and discuss listing considerations for specific parameters. It was envisioned that this would have already occurred. Would these meetings still be useful if they were scheduled in mid-July? Which parameters are you most interested in discussing? Specific parameters include: sediment, bioaccumulative substances, pathogens, pesticides, metals, other organic compounds, temperature, habitat and toxicity, nutrients, and "trash, settable solids & scum."

At this point, it seems too late for focus groups to get together to discuss issues and form any consensus regarding criteria. An e-mail forum might be best to share solutions or solicit advice concerning each groups focus. Will you be the contact for broader issues such as documentation requirements, deadlines, questions of time and space inherent to all data sets, etc.?

From: Keri Cole
To: Alan Monji; Deborah Jayne; Joan Brackin; Kyle Olewnik; Linda Pardy; Lisa Brown
Date: 6/25/01 3:04PM
Subject: 303d

Hey guys
Attached is a copy of the 303d procedure memo we put together. It basically sums up everything we already discussed in our meeting. The only main change is that you will be looking at waterbodies within watersheds, as opposed to pollutants (it is a more efficient way to review data sets). You may still need to consult our in-house experts (e.g. Kyle for metals, etc.) if that is an issue for the data you are evaluating.

Also attached is a revised version of the catalogue spreadsheet for the data. Remember that this was just an inventory of what was submitted, not a proposed list.

Jimmy has the files for you to pick up ASAP.

This is a time-consuming process and your commitment is needed. We are still shooting to have a draft ready by early August. I realize July is a very busy month for both TMDLers and shipyard sediment cleanup folks. Please discuss any anticipated workload conflicts ASAP with Deborah.

Also if you have any other questions over the next week and a half while I am out, check with Jimmy - he is now a 303d expert. Thanks everyone, in advance for you hard work on this.

kc (soon to be km)

CC: David Barker; Greig Peters; James Smith; Lesley Dobalian

Winston H. Hickox
Secretary for Environmental Protection

Gray Davis
Governor

TO: 303(d) List Update Team

FROM: K. Cole
J. Smith

DATE: June 21, 2001

SUBJECT: Region 9's 2002 CWA SECTION 303(d) Preparation of Recommendations to the SWRCB

Introduction

As you are aware, each of the Regional Boards has been asked to assist the State Board in preparing an update to the State's Clean Water Act Section 303(d) list. The 303(d) list identifies surface waters not currently attaining (or not anticipated to attain) applicable water quality standards. The update to the 303(d) list may include additions of new waterbodies and pollutants to the list; removal of waterbodies and pollutants from list, if new data indicates that standards are being attained; and changes to the description of waterbodies currently listed (e.g. refinement of identified impaired reaches, changes in priority, etc).

As we discussed during our recent meeting, it is time to start evaluating the collected information/data and recommend updates to the list. Also as we discussed, this will be a team effort in an attempt to utilize various team members' expertise, distribute the workload and ultimately prepare recommendations that we support and are defensible. Additionally, Greig Peter will be assisting and advising us in the evaluation and development process.

In contrast to our initial discussion to evaluate the data by pollutant type, each team member has instead been assigned a watershed and is responsible for reviewing the available data for the entire watershed (see attached spreadsheet). For some of the larger watersheds and/or those for which we have received more data, two staff have been assigned to it. It is up to you how the work is divided and communicated between partners. The files have been arranged by waterbody and all files for that watershed will be distributed to the individual team members. In most cases, the files contain the complete information received, but in some, there is a reference page as to where that data is stored and the team member will have to retrieve it.

Though minimal published guidance is available for this process, it is important to consider the following as you begin your initial screening and in-depth evaluation of the data/information. These factors and criteria are based on the published EPA and State guidance including the following:

- ✓ *Use of Fish and Shellfish Advisories and Classifications in 303(d) and 305(b) Listing Decisions*, Geoffrey H. Grubbs and Robert H. Wayland III, Oct. 24, 2000;
- ✓ *EPA Review of 2000 Section 303(d) Lists*, Robert H. Wayland III, April 28, 2000;
- ✓ *New Policies for Establishing and Implementing Total Maximum Daily Loads,* Bob Perciasepe, August 8, 1997;
- ✓ *National Clarifying Guidance for 1998 State and Territory Section 303(d) Listing Decisions,* Robert H. Wayland III, August 17, 1997.
- ✓ *Guidance for 1994 Section 303(d) Lists*, Geoffrey H. Grubbs, November 26, 1993;
- ✓ *1998 Clean Water Act (CWA) Section 303(d) Listing Guidelines for California* RWQCB, SWRCB, USEPA, August 11, 1997.

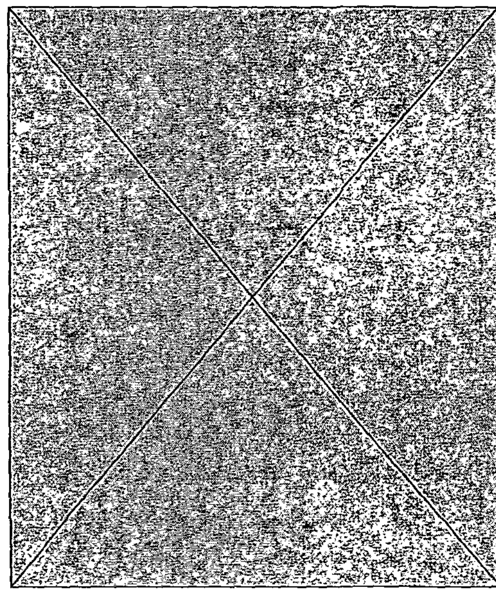
<u>Listing Factors</u>
Waterbodies and associated pollutants should be recommended for addition to the 303(d) list if any one of these factors is met:

1. Beneficial uses are impaired or are expected to be impaired within the listing cycle. Impairment is based upon evaluation of chemical, physical, or biological conditions. Impairment will be determined by qualitative assessment, physical/ chemical monitoring, bioassay tests, and/or other biological monitoring. Applicable federal criteria and the Regional Board's Basin Plan

water quality objectives determine the basis for impairment status.

2. Existing effluent limits (NPDES or WDRs) and pollution control requirements (i.e. BMPs) are not stringent enough to protect beneficial uses and attain water quality objectives.

3. Health advisories are in effect (fishing, swimming and drinking water).



4. Data shows exceeded levels of pollutant concentrations in consumable fish or shellfish inhabiting that waterbody. Criteria or guidelines related to protection of human and wildlife consumption include, but are not limited to, U.S. Food and Drug Administration Action Levels, National Academy of Sciences Guidelines, U.S. Environmental Protection Agency tissue criteria.

<u>Delisting Factors</u>
Water bodies may be removed from the list for specific pollutants or stressors if any one of these factors is met:

1. Documentation shows the water quality objectives are being met and the beneficial uses are no longer impaired

2. Evidence shows that faulty data led to the initial listing.

3. A TMDL has been approved by USEPA for the waterbody/pollutant combination.

4. Water quality objectives have been revised and the exceedance of these objectives is thereby eliminated

5. A beneficial use is de-designated after U.S. EPA approval of a Use Attainability Analysis, and the non-support issue is thereby eliminated.

6. If other control and enforcement actions are **in place** to correct the impairment and restore the beneficial uses (e.g. NPDES permits, MS4 permits, WDRs, or enforcement actions). The measure must be enforceable, include a reasonable timetable and are sufficient to meet the objectives.

<u>Existing Listings</u>
Additionally, if a waterbody is currently listed as impaired it will not be reevaluated during this listing process and will remain on the list, unless there is data that demonstrates improvement or elimination of the impairment.

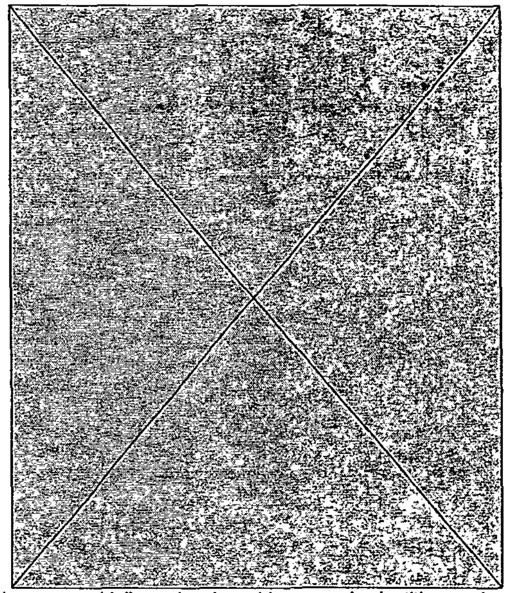
<u>Evaluation Criteria</u>
In general, the following should be used in evaluating data relative to applicable water quality objectives:

1. Applicable numeric water quality objectives contained in the Basin Plan for the specific waterbody.

2. Applicable numeric standards as define in the *California Ocean Plan* and *Implementation Policy for Toxics Standards for Inland Surface Waters, Enclosed Bays and Estuaries (SIP).*

3. Applicable water quality standards contained in the National and California Toxics Rules. Both the Basin Plan and federal rules governing a specific parameter should be read carefully, since there can be site specific applications or exceptions.

4. Water quality criteria developed by USEPA, California DFG, and the California DHS. Such criteria should be used to interpret narrative water quality objectives.



5. Guidance or guidelines developed by agencies/entities such as the Food and Drug Administration, National Academy of Sciences, and the Agency for Toxic Substances and Disease Registry and the California DHS.

6. Criteria or standards developed in other states (e.g. Florida) or regions (e.g. RWQCBs 4 & 5). Such criteria should be used with caution. The environmental setting, assumptions, and risk factors considered may not be consistent with the San Diego Regional Board water quality objectives.

7. Findings in peer-reviewed literature, listing decisions made in similar settings within the State, and/or "weight of evidence" based on information and evaluations performed by outside agencies or groups. Generally, a more extensive description will be needed to justify the impairment or lack of impairment determination. Clear links should be described between the literature, findings in similar settings, or outside evaluations and the non-attainment of water quality objectives.

There are no specific minimum data requirements or a specific frequency of exceedance for making a finding that water quality objectives are not attained. As directed by the State Board a "weight of evidence" approach is to be used.

<u>Priority Ranking</u>

A priority ranking is required for listed waters to guide TMDL planning. TMDLs will be ranked into high, medium or low priority categories based on:

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

2. Degree of impairment or threat (such as number of pollutants/stressors of concern, and number of beneficial uses impaired)

3. Conformity with related activities in the watershed (such as existence of watershed assessment, planning, pollution control, and remediation, or restoration efforts in the area)

4. Potential for beneficial use protection or recovery

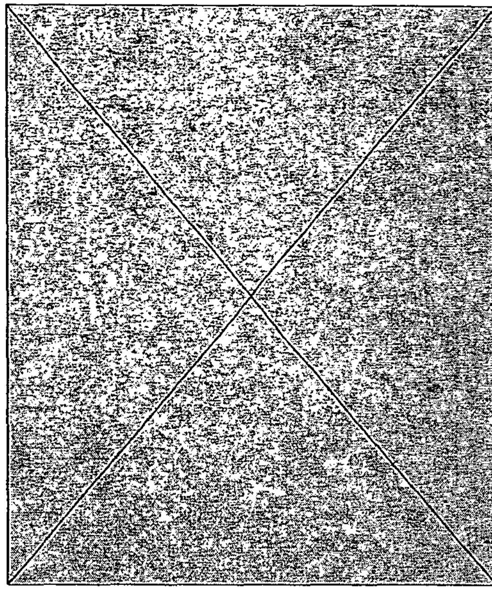
5. Degree of public concern and involvement

6. Availability of funding and information to address the water quality problem

7. Overall need for an adequate pace of TMDL development for all listed waters

It should be noted that the criteria can be applied in different ways to different water bodies and pollutants. For example, a water body may be severely impaired, but if there is little likelihood of beneficial use recovery than a lower priority might be given.

<u>Documentation</u>
It is essential that we document our decision-making activities throughout this process. As part of our recommendation submittal as well as during the State Board's formal comment repose period, we will need to reference the procedures and rationale for listing/delisitng decisions. This information will be submitted as part of the administrative record. Additionally clear and concise documentation will be useful when the information is stored in the GeoWBS system as part of the overall 305(b) water quality assessment.



A summary update fact sheet should be prepared for each 303(d) listing or delisting decision. Attached is a copy of Region 5's FACT SHEET TEMPLATE, which was revised per some of your comments. Though you may not be able to obtain all of the information requested on these sheets, it is important to be as complete as possible. These fact sheets should be put into the created file which should also include sources of information, criteria used, data sets reviewed (reference if in-house NPDES info used) and all supporting notes and information upon which your recommendation was based. Selected data or information from reports can be copied, as long as the cover sheet from the report is provided. For data retrieved electronically, the source and date of retrieval should be clearly recorded.

<u>Schedule</u>
As we discussed, we are to submit out recommendations to the State Board following our Regional Board meeting on October 10, 2001. We will also be providing a draft of our recommendations to the public for information and input in mid to late August. Therefore I am requesting your review and recommendations at your earliest convenience, but no later than the end of July. I will be requesting an update on your progress by July 20th, giving you approximately a month to evaluate the information. Continuous communication, collaboration and updates are essential if we are to deliver the recommendations on time and in complete form. Thank you in advance for your care and diligence on this project.

303(d) Fact Sheet Region 9 Water Quality Control Board
(Addition, deletion or change to list and waterbody/pollutant being addressed)

Summary of Proposed Action
Provide a brief summary of the proposed action.

303(d) Listing / TMDL Information
- ✓ Waterbody Name
- ✓ Hydrologic Unit
- ✓ Total Waterbody Size
- ✓ Pollutants / Stressors
- ✓ Suspected Sources
- ✓ Extent of Impairment
- ✓ Further Location Descriptors
- ✓ TMDL Priority
- ✓ Notes
- ✓ References

Watershed Characteristics
This should include a brief description of the major characteristics of the watershed and of the waterbody.

Water Quality Objectives Not Attained (or Objectives being Attained for Delisting)
Specific reference to the water quality objectives in the Basin Plan (or Cal or National Toxics Rule) not being attained should be made. If a narrative objective is not attained, the applicable criteria or guidelines being used should be described.

Evidence of Impairment
The data demonstrating impairment should be described here (or data demonstrating attainment). A summary of the data/information (including refs), along with a comparison to water quality objectives should be provided.

Extent of Impairment (or Extent of Attainment)
The specific reach or area that is impaired should be described. Any inferences drawn in determining the extent of impairment based on sampling location, land uses, or other watershed characteristics should be described here.

Potential Sources
The potential sources of the pollutant should be described here. Try to distinguish between suspected sources and known sources (e.g. available data indicates that urban storm drains have levels of diazinon several times higher than creek levels versus urban land uses and are a suspected source since 80% of the watershed is commercial/residential and diazinon is a commonly used pesticide for pest control on lawns and landscape).

TMDL Priority
The rational for the priority ranking must be given. The TMDL priority (high, medium, low) must take into account the severity of the pollution problem and the beneficial uses of the waterbody. Other rationales that could be applied include: community interest in addressing the problem, other resources/agencies working on the problem; available funding; the need to develop TMDLs at an adequate pace.

Information Sources

The references of information sources used to develop the recommended action should be described here.

From: James Smith
To: Keri Cole
Date: Mon, Jun 25, 2001 10:10 AM
Subject: Re: updated memo

Keri,

Looks good. I made a couple of editorial comments, but that is all.

-jimmy

J. Smith
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Region 9 Water Quality Control Board
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Winston H. Hickox
Secretary for Environmental Protection

Gray Davis
Governor

TO: 303(d) List Update Team

FROM: K. Cole
J. Smith

DATE: June 21, 2001

SUBJECT: Region 9's 2002 CWA SECTION 303(d)
Preparation of Recommendations to the SWRCB

Introduction

As you are aware, each of the Regional Boards has been asked to assist the State Board in preparing an update to the State's Clean Water Act Section 303(d) list. The 303(d) list identifies surface waters not currently attaining (or not anticipated to attain) applicable water quality standards. The update to the 303(d) list may include additions of new waterbodies and pollutants to the list; removal of waterbodies and pollutants from list, if new data indicates that standards are being attained; and changes to the description of waterbodies currently listed (e.g. refinement of identified impaired reaches, changes in priority, etc).

As we discussed during our recent meeting, it is time to start evaluating the collected information/data and recommend updates to the list. Also as we discussed, this will be a team effort in an attempt to utilize various team members' expertise, distribute the workload and ultimately prepare recommendations that we support and are defensible. Additionally, Greig Peter will be assisting and advising us in the evaluation and development process.

In contrast to our initial discussion to evaluate the data by pollutant type, each team member has instead been assigned a watershed and is responsible for reviewing the available data for the entire watershed (see attached spreadsheet). For some of the larger watersheds and/or those for which we have received more data, two staff have been assigned to it. It is up to you how the work is divided and communicated between partners. The files have been arranged by waterbody and all files for that watershed will be distributed to the individual team members. In most cases, the files contain the complete information received, but in some, there is a reference page as to where that data is stored and the team member will have to retrieve it.

Though minimal published guidance is available for this process, it is important to consider the following as you begin your initial screening and in-depth evaluation of the data/information. These factors and criteria are based on the published EPA and State guidance including the following:

- ✓ *Use of Fish and Shellfish Advisories and Classifications in 303(d) and 305(b) Listing Decisions*, Geoffrey H. Grubbs and Robert H. Wayland III, Oct. 24, 2000;
- ✓ *EPA Review of 2000 Section 303(d) Lists* , Robert H. Wayland III, April 28, 2000;
- ✓ *New Policies for Establishing and Implementing Total Maximum Daily Loads*, Bob Perciasepe, August 8, 1997;
- ✓ *National Clarifying Guidance for 1998 State and Territory Section 303(d) Listing Decisions*, Robert H. Wayland III, August 17, 1997.
- ✓ *Guidance for 1994 Section 303(d) Lists*, Geoffrey H. Grubbs, November 26, 1993;
- ✓ *1998 Clean Water Act (CWA) Section 303(d) Listing Guidelines for California* RWQCB, SWRCB, USEPA, August 11, 1997.

Listing Factors

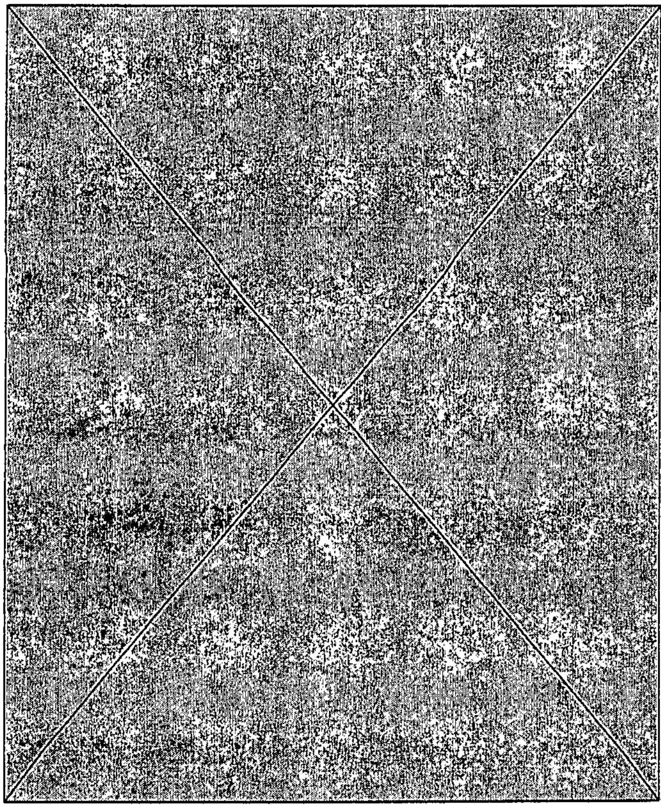
Waterbodies and associated pollutants should be recommended for addition to the 303(d) list if any one of these factors is met:

1. Beneficial uses are impaired or are expected to be impaired within the listing cycle. Impairment is based upon evaluation of chemical, physical, or biological conditions. Impairment will be determined by qualitative assessment, physical/ chemical monitoring, bioassay tests, and/or other biological monitoring. Applicable federal criteria and the Regional Board's Basin Plan

water quality objectives determine the basis for impairment status.

2. Existing effluent limits (NPDES or WDRs) and pollution control requirements (i.e. BMPs) are not stringent enough to protect beneficial uses and attain water quality objectives.

3. Health advisories are in effect (fishing, swimming and drinking water).



4. Data shows exceeded levels of pollutant concentrations in consumable fish or shellfish inhabiting that waterbody. Criteria or guidelines related to protection of human and wildlife consumption include, but are not limited to, U.S. Food and Drug Administration Action Levels, National Academy of Sciences Guidelines, U.S. Environmental Protection Agency tissue criteria.

<u>Delisting Factors</u>
Water bodies may be removed from the list for specific pollutants or stressors if any one of these factors is met:

1. Documentation shows the water quality objectives are being met and the beneficial uses are no longer impaired

2. Evidence shows that faulty data led to the initial listing.

3. A TMDL has been approved by USEPA for the waterbody/pollutant combination.

4. Water quality objectives have been revised and the exceedance of these objectives is thereby eliminated

5. A beneficial use is de-designated after U.S. EPA approval of a Use Attainability Analysis, and the non-support issue is thereby eliminated.

6. If other control and enforcement actions are **in place** to correct the impairment and restore the beneficial uses (e.g. NPDES permits, MS4 permits, WDRs, or enforcement actions). The measure must be enforceable, include a reasonable timetable and are sufficient to meet the objectives.

Existing Listings

Additionally, if a waterbody is currently listed as impaired it will not be reevaluated during this listing process and will remain on the list, unless there is new data that demonstrates improvement or elimination of the impairment.

Evaluation Criteria

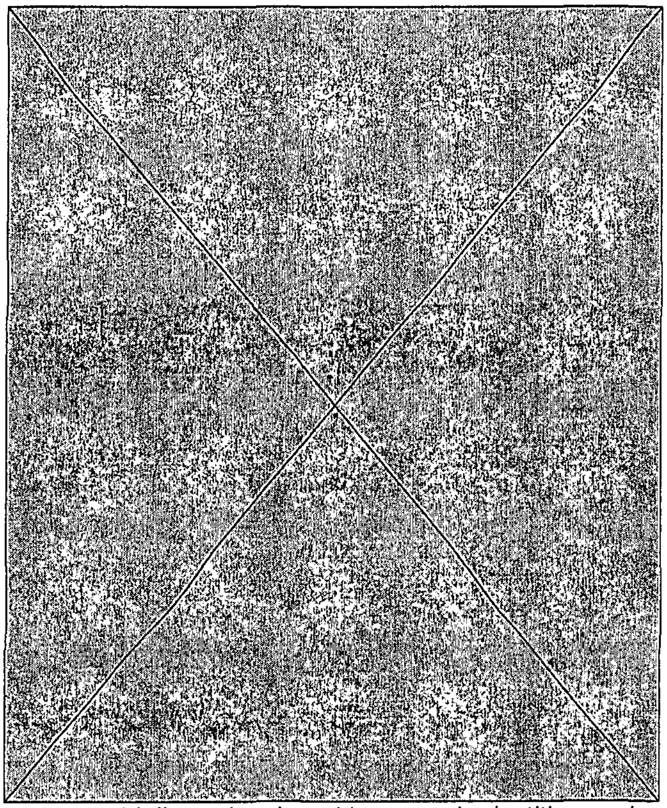
In general, the following should be used in evaluating data relative to applicable water quality objectives:

1. Applicable numeric water quality objectives contained in the Basin Plan for the specific waterbody.

2. Applicable numeric standards as defined in the *California Ocean Plan* and *Implementation Policy for Toxics Standards for Inland Surface Waters, Enclosed Bays and Estuaries (SIP).*

3. Applicable water quality standards contained in the National and California Toxics Rules. Both the Basin Plan and federal rules governing a specific parameter should be read carefully, since there can be site specific applications or exceptions.

4. Water quality criteria developed by USEPA, California DFG, and the California DHS. Such criteria should be used to interpret narrative water quality objectives.



5. Guidance or guidelines developed by agencies/entities such as the Food and Drug Administration, National Academy of Sciences, and the Agency for Toxic Substances and Disease Registry and the California DHS.

6. Criteria or standards developed in other states (e.g. Florida) or regions (e.g. RWQCBs 4 & 5). Such criteria should be used with caution. The environmental setting, assumptions, and risk factors considered may not be consistent with the San Diego Regional Board water quality objectives.

7. Findings in peer-reviewed literature, listing decisions made in similar settings within the State, and/or "weight of evidence" based on information and evaluations performed by outside agencies or groups. Generally, a more extensive description will be needed to justify the impairment or lack of impairment determination. Clear links should be described between the literature, findings in similar settings, or outside evaluations and the non-attainment of water quality objectives.

There are no specific minimum data requirements or a specific frequency of exceedance for making a finding that water quality objectives are not attained. As directed by the State Board a "weight of evidence" approach is to be used.

Priority Ranking

A priority ranking is required for listed waters to guide TMDL planning. TMDLs will be ranked into high, medium or low priority categories based on:

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

2. Degree of impairment or threat (such as number of pollutants/stressors of concern, and number of beneficial uses impaired)

3. Conformity with related activities in the watershed (such as existence of watershed assessment, planning, pollution control, and remediation, or restoration efforts in the area)

4. Potential for beneficial use protection or recovery

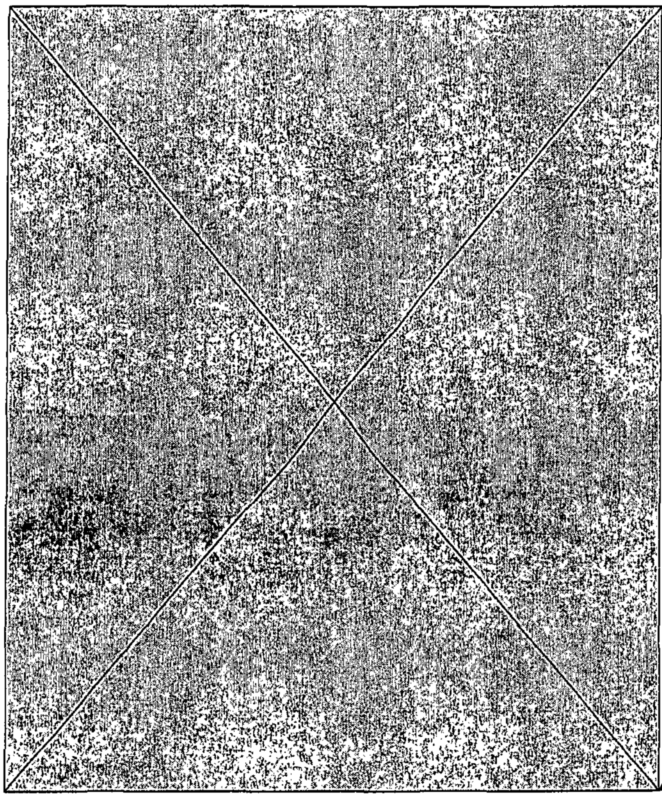
5. Degree of public concern and involvement

6. Availability of funding and information to address the water quality problem

7. Overall need for an adequate pace of TMDL development for all listed waters

It should be noted that the criteria can be applied in different ways to different water bodies and pollutants. For example, a water body may be severely impaired, but if there is little likelihood of beneficial use recovery than a lower priority might be given.

Documentation
It is essential that we document our decision-making activities throughout this process. As part of our recommendation submittal, as well as during the State Board's formal comment repose period, we will need to reference the procedures and rationale for listing/delisitng decisions. This information will be submitted as part of the administrative record. Additionally clear and concise documentation will be useful when the information is stored in the GeoWBS system as part of the overall 305(b) water quality assessment.



A summary update fact sheet should be prepared for each 303(d) listing or delisting decision. Attached is a copy of Region 5's FACT SHEET TEMPLATE, which was revised per some of your comments. Though you may not be able to obtain all of the information requested on these sheets, it is important to be as complete as possible. These fact sheets should be put into the created file which should also include sources of information, criteria used, data sets reviewed (reference if in-house NPDES info used) and all supporting notes and information upon which your recommendation was based. Selected data or information from reports can be copied, as long as the cover sheet from the report is provided. For data retrieved electronically, the source and date of retrieval should be clearly recorded.

Schedule

As we discussed, we are to submit out recommendations to the State Board following our Regional Board meeting on October 10, 2001. We will also be providing a draft of our recommendations to the public for information and input in mid to late August. Therefore I am requesting your review and recommendations at your earliest convenience, but no later than the end of July. I will be requesting an update on your progress by July 20th, giving you approximately a month to evaluate the information. Continuous communication, collaboration and updates are essential if we are to deliver the recommendations on time and in complete form. Thank you in advance for your care and diligence on this project.

303(d) Fact Sheet Region 9 Water Quality Control Board

(Addition, deletion or change to list and waterbody/pollutant being addressed)

Summary of Proposed Action
Provide a brief summary of the proposed action.

303(d) Listing / TMDL Information
- ✓ Waterbody Name
- ✓ Hydrologic Unit
- ✓ Total Waterbody Size
- ✓ Pollutants / Stressors
- ✓ Suspected Sources
- ✓ Extent of Impairment
- ✓ Further Location Descriptors
- ✓ TMDL Priority
- ✓ Notes
- ✓ References

Watershed Characteristics
This should include a brief description of the major characteristics of the watershed and of the waterbody.

Water Quality Objectives Not Attained (or Objectives being Attained for Delisting)
Specific reference to the water quality objectives in the Basin Plan (or Cal or National Toxics Rule) not being attained should be made. If a narrative objective is not attained, the applicable criteria or guidelines being used should be described.

Evidence of Impairment
The data demonstrating impairment should be described here (or data demonstrating attainment). A summary of the data/information (including refs), along with a comparison to water quality objectives should be provided.

Extent of Impairment (or Extent of Attainment)
The specific reach or area that is impaired should be described. Any inferences drawn in determining the extent of impairment based on sampling location, land uses, or other watershed characteristics should be described here.

Potential Sources
The potential sources of the pollutant should be described here. Try to distinguish between suspected sources and known sources (e.g. available data indicates that urban storm drains have levels of diazinon several times higher than creek levels. Therefore, rban land uses are a suspected source since 80% of the watershed is commercial/residential and diazinon is a commonly used pesticide for pest control on lawns and landscape).

TMDL Priority
The rational for the priority ranking must be given. The TMDL priority (high, medium, low) must take into account the severity of the pollution problem and the beneficial uses of the waterbody. Other rationales that could be applied include: community interest in addressing the problem, other resources/agencies working on the problem; available funding; the need to develop TMDLs at an adequate pace.

Information Sources

The references of information sources used to develop the recommended action should be described here.

From: Deborah Jayne
To: James Smith; Keri Cole
Date: Fri, Jun 22, 2001 12:18 PM
Subject: Fwd: TMDL Listing Process

Keri and Jimmy:
I have attached an email from SWRCB that needs a response (short turn around time). Keri, will pls develop our response (pls cc me and Jimmy). Let Valerie know that you are the lead contact person for Rg 9 and ask her to add your name to her email list.

Also I have reviewed your draft guidance document. Overall it looks good. I have a few questions and minor edits. I will come back to go over these with you after lunch. I was glad to see that the SWRCB will be reviewing these guidance documents too. Too bad they are not developing consistent statewide guidance for the regions. Thats the way it should be. Oh well. Good job on your effort so far.
Deb

CC: Alan Monji

From: James Smith
To: Keri Cole
Date: Mon, Jun 25, 2001 9:00 AM
Subject: reply to V. Conner re 303(d) status

Keri and Deborah,

The attached file contains our reply to Valerie Conner's request for information regarding the status of our 2002 303(d) listing effort. This is the second iteration and incorporates Keri's edits.

-jimmy

J. Smith
Environmental Specialist
Region 9 Water Quality Control Board
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San Diego, CA 92124-1324
(858) 467-2732
FX (858) 571-6972
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CC: Deborah Jayne

Questions to assess current status of TMDL listing activities:

1. How much information was submitted to your Region for evaluation for the upcoming 2002 TMDL submittal? (We don't need a precise count, but a feel for how much information you are reviewing. For example, 4 boxes of reports or about 50 individual submittals).

Region 9 has approximately 40 different submittals (in-house and external) of data to review. These include: Planning studies, Survey Assessments, Monitoring Reports, NPDES Compliance Data, Stormwater Permit Compliance Reports, Health Care Agency Beach Closures, City of San Diego Monitoring Reports, USGS Monitoring, Discharge Monitoring Reports, Citizen-submitted Packages, modeling studies, photographs, Benthic Community Assessments, Toxic Substance Monitoring Program and other miscellaneous sources of data. Public solicitation notices mailed and advertised in local newspapers on 7 Mar 01 and a Public Workshop was held on 4 April 01. We are only reviewing data generated since July 1997 and received in our office by 15 May 01.

2. Can you make any estimates about the number of new listings or delistings you are anticipating? (Your best "guesstimate" is a sufficient answer.)

Our best guesstimate (emphasizing guess) is 5 - 8 new listings and no delistings.

3. What process are you using to evaluate new information? (If you have a written summary of the process, can you forward a copy?)

Please see attached file: Region 9's 2002 CWA Section 303(d). This model is based upon the listing criteria as delineated by Joe Karkoski (R5WQCB).

4. What type of data quality evaluations are you conducting?

QA \ QC ? We will be relying on source QA/QC evaluations where applicable. If not available, the source, type and quantity of the data will be reviewed.

5. Are you compiling all data in some sort of database?

Initially, we have created an excel database to catalogue all incoming data for waterbody affected, narrative location, document title, date received, dates of sampling, and contact person. Eventually, all data will be input to the Geo Water Body System Database (GWBS).

6. Are you preparing water body fact sheets or some other written summary for each listing?

Water body fact sheets are being prepared and are part of the attached file: Region 9's 2002 CWA Section 303(d). Again, this is modeled after the efforts of Joe Karkoski (R5WQCB).

7. Where are you at in the process of evaluating new information? (Your best "guesstimate" is a sufficient answer.)

We have only recently developed our internal guidelines (see attached) and are still editing this document. Beginning 25 June, individual staff members will start in-depth review of the data, determine which data can be used and make recommendations for list additions or removals. We plan to have draft recommendations by early August.

8. What criteria or considerations are you using to decide whether to list a water body?

Please see attached document for specifics. In general, a water body will be listed if there is beneficial use impairment based upon evaluation of chemical, physical, or biological conditions. Data will be compared against the R9 Basin Plan and appropriate State and Federal Regulations. Health Advisory postings and contaminate levels in consumable fish and shellfish will also be compared against regulatory standards. We have no minimum data requirements or a specific frequency of exceedances, but will rely upon a weight of evidence approach to listing.

9. What criteria or considerations are you using to determine priorities for listings?

Priority rankings will be based upon water body significance, degree of impairment, existence of other efforts in the waterbody to restore beneficial uses, potential for beneficial use recovery, degree of public concern, and the availability of funding and data. Please see attached file for further clarification.

10. What is your schedule for evaluating information? (This should include any staff reports, public participation steps or Board meetings and when you plan to submit information to State Board.)

25 June	Data distributed to staff for in-depth review and evaluation
early Aug	Complete internal draft recommendations for listing / delisting
mid Aug	Post Draft listing update for public scrutiny
mid Aug	Conduct Public Workshop?
Sept-Oct	End of 30-day public review / comment period. Respond to public comments
Oct Mtg.	Finalize recommendations, Present listing / delisting to R9 Board
end of Oct	Present Recommendations to SWRCB

11. What role will your Board play? Will your Board formally approve the list or will it be presented as an information item?

We anticipate the recommendations will be presented to the Board as an informational item at the October Board Meeting.

12. The TMDL roundtable had asked DWQ staff to arrange 11 focus groups to meet and discuss listing considerations for specific parameters. It was envisioned that this would have already occurred. Would these meetings still be useful if they were scheduled in mid-July? Which parameters are you most interested in discussing? Specific parameters include: sediment, bioaccumulative substances, pathogens, pesticides, metals, other organic compounds, temperature, habitat and toxicity, nutrients, and "trash, settable solids & scum."

At this point, it seems too late for focus groups to get together to discuss issues and form any consensus regarding criteria. An e-mail forum might be best to share solutions or solicit advice concerning each groups focus. Will you be the contact for broader issues such as documentation requirements, deadlines, questions of time and space inherent to all data sets, etc.?

From: Valerie Connor
To: Alan Monji; Angela Carpenter; Bruce Gwynne; Chuck Curtis; Cindy Rofer-Wise; Daniel McClure; David Evans; David Leland; Deborah Jayne; Ed Schumacher; Hope Smythe; Jonathan Bishop; Linda Pardy; Lisa McCann; Mark Angelo; Melinda Becker; Renee DeShazo; Teresa Newkirk; Thomas Mumley
Date: Fri, Jun 22, 2001 12:04 PM
Subject: TMDL Listing Process

The 2002 303(d) listing process has recently been reassigned to the Planning Section in the Division of Water Quality. The reason for this change is that the listing is essentially an assessment and planning effort. Another practical reason for the decision is that the Regulatory Section had an unreasonable TMDL workload. It is hoped that this change will make the listing process proceed more efficiently. The Planning Section is in the process of reviewing minutes from earlier roundtable meetings and conference calls, but we also need to know the status of ongoing activities at each Regional Board. We will use this information to determine appropriate "next steps". Please briefly answer the following questions in what ever way is most convenient for you (you can call me at 916 341-5573), and also send copies of any 303(d) schedules, procedures or listing considerations that you have developed. We will be evaluating all input received by the middle of next week; I apologize for the very short turnaround time. Thank you.

Questions to assess current status of TMDL listing activities:

1. How much information was submitted to your Region for evaluation for the upcoming 2002 TMDL submittal? (We don't need a precise count, but a feel for how much information you are reviewing. For example, 4 boxes of reports or about 50 individual submittals).

2. Can you make any estimates about the number of new listings or delistings you are anticipating? (Your best "guesstimate" is a sufficient answer.)

3. What process are you using to evaluate new information? (If you have a written summary of the process, can you forward a copy?)

4. What type of data quality evaluations are you conducting?

5. Are you compiling all data in some sort of database?

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7. Where are you at in the process of evaluating new information? (Your best "guesstimate" is a sufficient answer.)

8. What criteria or considerations are you using to decide whether to list a water body?

9. What criteria or considerations are you using to determine priorities for listings?

10. What is your schedule for evaluating information? (This should include any staff reports, public participation steps or Board meetings and when you plan to submit information to State Board.)

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Valerie Connor
Water Quality Assessment Unit
State Water Resources Control Board
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fax: (916)-5550
connv@swrcb.ca.gov

CC: Joe Karkoski; Les Grober

From: Deborah Jayne
To: James Smith; Keri Cole
Date: 6/22/01 12:18PM
Subject: Fwd: TMDL Listing Process

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CC: Alan Monji

California Regional Water Quality Control Board
San Diego Region

Winston H. Hickox
Secretary for Environmental Protection

9771 Clairemont Mesa Boulevard, Suite A, San Diego, California 92124-1331
Phone (858) 467-2952 • FAX (858) 571-6972

Gray Davis
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TO: 303(d) List Update Team

FROM: K. Cole
J. Smith

DATE: June 21, 2001

SUBJECT: Region 9's 2002 CWA SECTION 303(d)
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Regional Board's Basin Plan water quality objectives determine the basis for impairment status.

- ✓ Existing effluent limits (NPDES or WDRs) and pollution control requirements (i.e. BMPs) are not stringent enough to protect beneficial uses and attain water quality objectives.

- ✓ Health advisories are in effect (fishing, swimming and drinking water).

- ✓ Data shows exceeded levels of pollutant concentrations in consumable fish or shellfish habitating that waterbody. Criteria or guidelines related to protection of human and wildlife consumption include, but are not limited to, U.S. Food and Drug Administration Action Levels, National Academy of Sciences Guidelines, U.S. Environmental Protection Agency tissue criteria.

- ✓ Waterbody is currently listed as impaired and there is no data supporting improvement or elimination of the impairment

Delisting Factors

Water bodies may be removed from the list for specific pollutants or stressors if any one of these factors is met:

- ✓ Documentation shows the water quality objectives are being met and the beneficial uses are no longer impaired

- ✓ Evidence shows that faulty data led to the initial listing.

- ✓ A TMDL has been approved by USEPA for the waterbody/pollutant combination.

- ✓ Water quality objectives have been revised and the exceedance of these objectives is thereby eliminated

- ✓ A beneficial use is de-designated after U.S. EPA approval of a Use Attainability Analysis, and the non-support issue is thereby eliminated.

- ✓ If other control measures are in place to correct the impairment and restore the beneficial uses (e.g. NPDES permits, MS4 permits, WDRs, or enforcement actions). The measures are enforceable and include a timetable.

Evaluation Criteria

In general, the following should be used in evaluating data relative to applicable water quality objectives:

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There are no specific minimum data requirements or a specific frequency of exceedance for making a finding that water quality objectives are not attained. As directed by the State Board a "weight of evidence" approach is to be used. In general, more data is needed to interpret environmental results that are very specific to time and geography. Less data would be needed to make a determination based on environmental results that serve as integrators over space or time. So more water column chemistry data would generally be needed to determine impairment than fish tissue chemistry data. Also less water column chemistry data may be needed to make an impairment determination (or lack of impairment determination) if there is other information to support the findings from the water column chemistry (e.g. correlations could be made between pesticide use patterns and the presence of pesticides in surface water).

<u>Priority Ranking</u>
A priority ranking is required for listed waters to guide TMDL planning. TMDLs will be ranked into high, medium or 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)

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From: Lisa Brown
To: Alan Monji; Deborah Jayne; James Smith; Joan Brackin; Keri Cole; Lesley Dobalian; Linda Pardy; Pete Michael; Tom Alo
Date: Tue, Jun 19, 2001 7:25 AM
Subject: Fwd: water quality monitoring news

See attached articles regarding 303(d) listing and TMDLs.

From: McKenney GS13 Larry B <McKenneyLB@mail.cpp.usmc.mil>
To: "'Smrw@email.msn.com'" <Smrw@email.msn.com>, "'Joe@fpud.com'" <Joe@fpud.com>, "'missnrcd@tfb.com'" <missnrcd@tfb.com>, "'Craige@rcwd.riverside.ca.us'" <Craige@rcwd.riverside.ca.us>, "'wburford@tnc.org'" <wburford@tnc.org>, "'rwarich@home.com'" <rwarich@home.com>, "'lseiger@sunstroke.sdsu.edu'" <lseiger@sunstroke.sdsu.edu>, "'pgebert@sdcwa.org'" <pgebert@sdcwa.org>, "'ggutman@hineshort.com'" <ggutman@hineshort.com>, "'stever@stetsonengineers.com'" <stever@stetsonengineers.com>, "'skasower@att.net'" <skasower@att.net>, "'rickgundry@bia.gov'" <rickgundry@bia.gov>, "'garnerm@emwd.org'" <garnerm@emwd.org>, "'mcookkeh@co.san-diego.ca.us'" <mcookkeh@co.san-diego.ca.us>, "'rallanpw@co.san-diego.ca.us'" <rallanpw@co.san-diego.ca.us>, "'gwilkipw@co.san-diego.ca.us'" <gwilkipw@co.san-diego.ca.us>, "'browl@rb9.swrcb.ca.gov'" <browl@rb9.swrcb.ca.gov>, "'knight.robert@sbeach.navy.mil'" <knight.robert@sbeach.navy.mil>, "'DonP@rcwd.riverside.ca.us'" <DonP@rcwd.riverside.ca.us>, "'savagemt@cdm.com'" <savagemt@cdm.com>, "'gibsd@rb9.swrcb.ca.gov'" <gibsd@rb9.swrcb.ca.gov>, "'butterwick.mary@epamail.epa.gov'" <butterwick.mary@epamail.epa.gov>, "'sshapiro@sciences.sdsu.edu'" <sshapiro@sciences.sdsu.edu>, "'bbiernaka@hineshort.com'" <bbiernaka@hineshort.com>, "'lcgarcia@co.riverside.ca.us'" <lcgarcia@co.riverside.ca.us>, "'mikem@water.ca.gov'" <mikem@water.ca.gov>, Carlson GS13 Larry E <CarlsonLE@mail.cpp.usmc.mil>, Trost GS12 Theresa T <TrostT@mail.cpp.usmc.mil>, "'brookshirems@cdm.com'" <brookshirems@cdm.com>, "'mdwhite@consbio.org'" <mdwhite@consbio.org>, "'lukerm@emwd.org'" <lukerm@emwd.org>, "'emarcd@pe.net'" <emarcd@pe.net>, "'klewinger@fpud.com'" <klewinger@fpud.com>, "'bobl@rcwd.riverside.ca.us'" <bobl@rcwd.riverside.ca.us>, "'itodtxpw@co.san-diego.ca.us'" <itodtxpw@co.san-diego.ca.us>, "'baczs@rb9.swrcb.ca.gov'" <baczs@rb9.swrcb.ca.gov>, "'ekleineh@co.san-diego.ca.us'" <ekleineh@co.san-diego.ca.us>, "'mcwd@iinet.com'" <mcwd@iinet.com>, "'vjmellano@ucdavis.edu'" <vjmellano@ucdavis.edu>, "'jorge-contreras@ca.nacdnet.org'" <jorge-contreras@ca.nacdnet.org>, "'cluke@sciences.sdsu.edu'" <cluke@sciences.sdsu.edu>, "'joyj@emwd.org'" <joyj@emwd.org>, "'mvanscoy@sciences.sdsu.edu'" <mvanscoy@sciences.sdsu.edu>, "'skupferm@ca.blm.gov'" <skupferm@ca.blm.gov>, "'rfisher@usgs.gov'" <rfisher@usgs.gov>
Date: Mon, Jun 18, 2001 5:55 PM
Subject: water quality monitoring news

Three news articles that imply that our Santa Margarita River Watershed Water Quality Monitoring Group is on the right track. Don't forget our next meeting: July 11 at Rancho California Water District.

FEDERAL REGULATIONS
Clinton's water cleanup called flawed
Scientists say sites were poorly chosen for pollution control
Associated Press - 6/16/01
WASHINGTON - The Clinton administration told states to clean up thousands of lakes and rivers without enough evidence to ensure that the right bodies of water were being picked, a panel of scientists said yesterday.
The National Academy of Sciences panel agreed that water pollution remains a serious problem across the country. But its report is expected to provide support for the Bush administration and some in Congress who want to overhaul the regulation that requires states to develop broad plans to reduce runoff that is polluting lakes and streams.
In October, Congress suspended implementation of the regulation, which had been questioned by many states and strongly opposed by farming and business interests. A report issued yesterday by an eight-member panel of scientists of the Academy's National Research Council said the program needs to be re-examined with an eye toward improving the way impaired water bodies are selected.
The scientists concluded that many of the waterways were picked without adequate information about water quality or enough scientific review, while still other waters in need of protection may not have made the list. The

report also criticized the program's use of a broad criterion -- one based on whether a water body is suitable for swimming or fishing -- to determine when a section of a river or lake is in need of cleanup. Instead, different areas should be approved for different uses, the scientists said.
Although criticizing the federal program, which stems from requirements under the 1970 [sic] Clean Water Act, the panel's report agreed that pollution from agriculture and storm water runoff is jeopardizing water quality in thousands of lakes, rivers and streams. The panel noted that for 30 years federal environmental efforts have focused on discharges into waterways from single points such as factories, businesses and sewage treatment facilities, all of which are required to comply with discharge permits.
But pollution from "nonpoint" sources -- including nutrients, bacteria, sediment, pesticides and chemicals from lawns and farms -- "have been largely overlooked," the scientists said. #
RELATED
Poor Data Found to Stall Water Cleanup
Scientific panel criticizes inconsistencies in identifying pollution in lakes and streams.
Los Angeles Times - 6/16/01
By Deborah Schoch, environmental writer
A lack of scientific information is undercutting efforts to halt the flow of bacteria, sediments, pesticides and other pollutants into the nation's lakes and streams, an advisory council of the National Academy of Sciences concluded in a report issued Friday.
The report, by a panel of the National Research Council, questioned the data and methodology underpinning cleanup decisions affecting 21,000 bodies of water around the country. "Considerable uncertainty exists about whether some of these waters violate standards," the report says. "In addition, other waters that are impaired have yet to be identified." The panel found numerous flaws in the ways states measure the cleanliness of their bodies of water, concluding that efforts to reduce pollution from such sources as industry, farming and urban areas have been widely inconsistent.
The report does not single out California, but it has special resonance in Southern California, where torrents of tainted urban runoff regularly flow into coastal waters and taint the region's beaches.
Release of the report comes at a politically sensitive time, with both industry and environmentalists waiting to see how the Bush administration deals with a controversial rule, on hold from the Clinton era, that would push regulators to tighten controls on water pollution. Spokesmen for both groups reacted enthusiastically to sections of the report.
The scientific panel that wrote the report recommends that the U.S. Environmental Protection Agency, charged with regulating water pollution, adapt a more science-based approach in identifying polluted waters and creating cleanup plans. It notes the growing importance of controlling "nonpoint pollution sources," the runoff from far-flung sources, including farms, golf courses, backyards and paved lots.
"The best available science, especially with regard to nonpoint sources of pollution, will be needed for regulatory and non-regulatory actions to be equitable and effective," the report states.
The chairman of the National Research Council panel, Kenneth H. Reckhow, a professor of water resources at Duke University, noted several aspects of the report as key. Reckhow said that some states rushing to meet federal requirements had labeled some water bodies "impaired" or polluted without adequate data, meaning that some should not be listed as polluted while other tainted rivers and lakes have not been identified as such.

"That's an inefficient use of resources," Reckhow said. " . . . Resources could be taken away from a water body that is truly violated. What we'd like to do is identify all of the water bodies without error." The panel recommends that the EPA launch a two-step process that allows states to put suspect waters on a preliminary list, gather more data and then determine a final list of waters in need of cleanup. Reckhow also stressed that science is riddled with uncertainty. So the report calls for moving ahead with cleanup plans, reviewing and revising them periodically using new information and techniques.

The report deals with a water-quality program known as "TMDL" or "total maximum daily loads"--an EPA effort to measure and control water pollution. A controversial Clinton administration rule that would add clout to the Clean Water Act and strengthen controls of polluted runoff was put on hold by Congress last fall, pending more research. Congress asked the National Research Council to study how the TMDL program identifies polluted waters and how to improve them.

A congressional staff member said Friday that the tighter EPA rule, also now on hold, has sparked tremendous debate on Capitol Hill. Asked how the report could affect that debate, the source said, "Most people consider it an extremely remote scenario that the EPA would decide to let the rule go into effect without any changes and that Congress would allow that to happen."#

FEDERAL REGULATIONS

Study: Water pollution levels unknown

San Jose Mercury News - 6/16/01

By Paul Rogers, staff writer

In a study that could have a major impact on efforts to clean up San Francisco Bay, a panel of scientific experts said Friday that America's primary regulations to reduce polluted runoff into streams, rivers, lakes and bays are not based on sufficient science.

The report from the National Academy of Sciences concluded that state and federal officials, often rushing to meet deadlines after losing lawsuits from environmental groups, may have targeted the wrong bodies of water for cleanup and often have not completed enough research to know the extent of water pollution.

"Many waters now on state lists were placed there without the benefit of adequate water quality standards, data, or water body assessment," the report found. The eight-member panel agreed that runoff from pesticides on farms, oil on roads, fertilizers in yards and other sources remains a major environmental problem.

"We're trying to get more of a common-sense approach," said Antony Donigian, a member of the panel and president of Aqua Terra Consultants in Mountain View. "If we don't have enough data to know whether bodies of water should have been put on the lists, then maybe we should back off and do more study."

Since Congress passed the Clean Water Act in 1972, the federal Environmental Protection Agency has made great strides in cleaning up water pollution from "point sources" such as factories and sewage plants. But the remaining problem is from so-called "non-point source" pollution, or runoff, which washes into bays, lakes and streams during rainfall and is much harder to control.

Currently the EPA classifies more than 21,000 rivers, streams and lakes -- 40 percent of all U.S. water bodies -- as "impaired." That means they have pollutant levels, mostly from runoff, that make them unsafe for eating fish or regular swimming.

San Francisco Bay, as well as many major rivers across California, is on the list. San Francisco Bay is listed as impaired for mercury that runs from old mines south of San Jose, as well as PCBs, copper, nickel, dioxin and several other pollutants.

Once the EPA lists a body of water as "impaired," it begins a lengthy process in which state water officials measure pollutants and try to set a "total maximum daily load," or TMDL level, that will return the water to health by targeting the farms, factories or cities causing the runoff.

Dave Smith, the TMDL team leader for the EPA in San Francisco, said Friday's report "appears pretty realistic and accurate." He said he hoped it could lead to better funding for water testing. "Some data collection is going on, but to develop good lists we ideally would need more," he said. That way, when rivers or lakes are found to be less polluted than thought, they could be removed from the impaired lists, he said.

Smith said there are about 500 lakes, streams and rivers in California that the state and the EPA classify as impaired. Of those, fewer than 50 have TMDL levels set yet.

Critics of the rules said the report bears out their concerns. "We should have a very serious evaluation of every stream placed on the list," said Ronda Lucas, a spokeswoman for the California Farm Bureau in Sacramento. "I think this report helps us. If we waste a lot of money on streams that aren't polluted, we have nothing to show for it and private landowners have to bear a huge burden." Farm bureau officials say runoff programs should be voluntary, and states, not the EPA, should have full authority.

The panel's report was requested last summer by Congress during debate over water laws. Last July, former EPA Administrator Carol Browner released new runoff rules, but they were delayed by Congress until Oct. 1. The rules would set a 15-year limit for states to complete TMDL lists for their waterways.

The new EPA administrator, Christie Todd Whitman, has not said whether she will uphold those rules. And some members of Congress have said they will try to block the rules, arguing that they could cost as much as $2 billion a year. "What EPA is proposing is pretty sweeping," said D.J. O'Brien, a spokesman for Sen. Tim Hutchinson, R-Ark. "We want to make sure they are not taking too heavy-handed an approach."

Among the report's recommendations is that EPA and state officials get more money from Congress to do better testing of water pollutants, fish and other wildlife. Also, the report calls for the EPA to set up a two-tiered system to place waterways on a preliminary list before regulations kick in.

"This is a very big problem in the Bay Area," said Grant Davis, executive director of the Bay Institute, an environmental group in San Rafael. "The National Academy of Sciences has recognized the complexity of setting total loads. But they are not looking to stall the program. We also support more research and more science."

Larry McKenney
Office of Water Resources
Camp Pendleton
(760)725-1059

From: Michael Porter
To: RB9-All Staff
Date: Fri, Jun 15, 2001 10:23 AM
Subject: 1999-2000 Annual SCCRWP Report

Colleagues,

I have been sent a copy of the annual Southern California Coastal Water Research Project report (1999-2000). Pasted below is the table of contents. As you can see, the articles cover a myriad of our programs, not just sewage treatment plant effluent monitoring. You are welcome to borrow my copy or review the report/articles online at http://www.sccwrp.org/pubs/annrpt/99-00/table_of_contents.htm

Enjoy.

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Additional Information

Commissioners and CTAG Members

Staff

Memorial to Willard Bascom

Mike Porter
Environmental Specialist III
San Diego RWQCB
858-467-2726
portm@rb9.swrcb.ca.gov

From: Stefan Lorenzato
To: Abu-Saba, Khalil; Becker, Melinda; Bishop, Jonathan ; Curtis, Chuck; Grober, Les; Gwynne, Bruce; Jayne, Deborah; Johnson, Bill; Karkoski, Joe; Leland, David; Levy, Michael; McCann, Lisa; McClure, Daniel; Monji, Alan; Moore, Steve; Mumley, Thomas; Newkirk, Teresa; Smith, David; Smythe, Hope; Unsicker, Judith
Date: Wed, Jun 13, 2001 9:54 AM
Subject: I am not longer working on 303 d listing

Hi all,

As of yesterday I am not longer involved in any of the 303(d) listing work. Val Connor and the Assessment Unit will have this duty. I had been working on a number of relevant issues that I will not bring to any formal conclusion. But to get a little closure for myself I scratched out the attached thoughts late last night. Hope it is a wee bit useful.

Stefan

CC: Ali, Syed; Barksdale, Pamela; Beaulaurier, Diane; Connor, Valerie; Frantz, Greg; Kassel, Jim; Levy, Michael; Lorenzato, Stefan; Rao, Linda; Richard, Nancy; Wilson, Craig J.

From: David Gibson
To: Keri Cole
Date: Tue, Jun 12, 2001 1:33 PM
Subject: meta data

Hi Keri,
I see what you mean about lots of meta data. I found lots of meta data for Hodges organics, but no organics data.

Dave

From: David Gibson
To: Keri Cole
Date: Tue, Jun 12, 2001 11:02 AM
Subject: Re: city of san diego data

Hi Keri,
I will look throught the reports to see if what I was looking for is there (especially for Hodges).

The storm water Copermittees submit their wet weather monitoring reports annually. They should be in the files under 10-6000.03. Also, Kyle and Phil both have some of the office copies of the reports. We have reports from 1993-2000.

The wet weather data is of mixed value, but there were special studies, especially in the Agua Hedionda watershed, that might be more useful. However, we did successfully list Chollas creek based in part on the wet weather data from these reports. Chollas Creek doesn't have significant dry weather baseflow. I don't think we should discount the wet weather data altogether. Some issues we might consider with respect to wet wether data:

1. Toxicity - This was the basis for listing Chollas Creek. The follow up TIEs identified diazinon as a source of the toxicity identified in the wet weather monitoring data.
2. Significant loadings of pollutants of concern - The reports, especially in the early years, provided mass loadings of a broad range of constituents throughout the County. I think we should look at metals such as zinc and copper for possible listings in some water bodies. Although these are chiefly toxic in the dissolved state, they settle into sediments and may be source of environmental degradation long after deposition. Future storm water permit monitoring requirements are focused in part on assessing this impact.

3. To the extent that we can link consistently high coliform bacteria levels in some receiving waters with human sources, a listing may be appropriate. However, I would prefer to tackle these instances in a CAO. Agua Hedionda, the San Diego River, and some coastal outfalls are examples.

Thanks for the info!

Dave

>>> Keri Cole 6/12/01 10:21:32 AM >>>
hey dave
i put all of the files that ron coss submitted on the following directory s:\wqs\303dlist\cityofsandiego\ in a folder for each water body.

we are going to start looking at all of these to see if there is anything there. would it be possible for you to do a quick review and perhaps highlight those that you think are of use and/or those that we shouldn't spend any time on?

also, where are the san diego county copermittees stormwater monitoring reports kept. i have the 1999-2000, but need 97-98, 98-99. again are there particular waterbodies which stand out in you mind for which these reports clearly show impairments . since most of these are wet-weather monitoring, i don't know how useful they are.

thanks so much for all of your help.
kc

From: James Smith
To: Joan Brackin; Keri Cole
Date: Tue, Jun 12, 2001 11:26 AM
Subject: Bight 98

Hi guys,

I've gone through the SCCWRP website and pulled out all available Bight 98 data. I've decompressed the files and they now reside at: s:\wqs\303dlist\Bight98

In summary, there is an abundance of coliform data for two dry seasons and once after a storm. The dry seasons are fairly clean, but freshwater outfalls can be polluted (up to 60% of shoreline miles). The storm event reveals exceedance of state stds at up to 87% of shoreline miles. The storm they sampled after was large (1.1 - 3.0") and is on the extreme end of annual events. Also provided are data on viruses. This bring up issues of spatial extent around outfalls and frequency of events that would cause the high pollution as observed in the study. Unfortunately, only virus stations are labeled with a place name.

Sediment toxicity data is also provided. BUT, due to the lack of sediment chemistry, benthic community analysis and questions about the validity of the tests themselves, we may not be able to use this data.

I have summed up much of this in a two page word file in the same location.

Enjoy!

-jimmy

J. G. Smith
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(858) 467-2732
FX (858) 571-6972
www.swrcb.ca.gov/rwqcb9

From: Keri Cole
To: David Gibson
Date: 6/12/01 10:21AM
Subject: city of san diego data

hey dave
i put all of the files that ron coss submitted on the following directory s:\wqs\303dlist\cityofsandiego\ in a folder for each water body.

we are going to start looking at all of these to see if there is anything there. would it be possible for you to do a quick review and perhaps highlight those that you think are of use and/or those that we shouldn't spend any time on?

also, where are the san diego county copermittees stormwater monitoring reports kept. i have the 1999-2000, but need 97-98, 98-99. again are there particular waterbodies which stand out in you mind for which these reports clearly show impairments . since most of these are wet-weather monitoring, i don't know how useful they are.

thanks so much for all of your help.
kc

CC: James Smith

From: Jeremy Haas
To: James Smith; Keri Cole
Date: 6/11/01 5:15PM
Subject: orange county 303(d)

Keri and Jimmy,
Here's a recap of our meeting regarding 303(d) list and Orange County.

1. Existing listed sites:
There is no data to justify removing sites currently listed. Some beach closures may be decreasing in the summer or during low flows due to low-flow diversions of stream water to the sewer lines.

2. Aliso and San Juan Watershed - Coliform
This summer we'll be receiving data on coliform levels throughout the Aliso and San Juan watersheds. I expect to see high levels at the outfalls, as we saw with the Aliso 205(j) study, but am not sure what to expect from the in-stream locations. In addition to the JO3PO2 issue, the copermittees have received funding, including Prop 13 money, to create wetlands and a biofiltration basin at two sites in the Aliso 205(j) study that showed high coliform levels. When completed, these are expected to lower coliform the coliform levels.

3. Aliso and San Juan - USACE studies
The Corps of Engineers studied the San Juan and Aliso watersheds, but did not collect water quaity data. They reviewed existing data, including the NPDES reports. They conclude that the watersheds are a mess, but most problems are attributed to hydrology, e.g., channel downcutting, erosion, sedimentation, etc., rather than strictly pollutants. In response, they have planned several in-stream projects to address the hydrology problems, and these projects are supposed to also improve in-stream and riparian habitat, but are generally not designed to prevent sources of pollution. The projects will require both Federal and local funds, so time will tell if they are done.

4. Potential 303(d) additions.
Based on the NPDES data, I would suggest the most appropriate candidates to add to the 303(d) list are Dana Point Harbor and Prima Deschecha.

As I remember more, I'll let you know.

-JCH

From: "Larry D. Cooper" <larryc@SCCWRP.ORG>
To: James Smith <smitj@rb9.swrcb.ca.gov>
Date: Mon, Jun 11, 2001 10:56 AM
Subject: Re: Bight 98

Hi Jimmy,

Sorry, what you see is what there is.

Larry

James Smith wrote:
>
> I was hoping for outfall location / street name / beach name / etc.
>
> Thanks for the quick reply,
> -jimmy
>
> J. G. Smith
> Environmental Specialist
> Region 9 Water Quality Control Board
> 9771 Clairemont Mesa Blvd, Suite A
> San Diego, CA 92124-1324
> (858) 467-2732
> FX (858) 571-6972
> www.swrcb.ca.gov/rwqcb9

From: "Larry D. Cooper" <larryc@SCCWRP.ORG>
To: James Smith <smitj@rb9.swrcb.ca.gov>
Date: Mon, Jun 11, 2001 10:11 AM
Subject: Re: Bight 98

The water body is always the Pacific Ocean. Other than that, I'm not sure what you are asking for.

Larry

James Smith wrote:
>
> Mr. Cooper,
>
> I am trying to use the Bight 98 data in quantifying impairment to water bodies in Region 9 so that may be added to the upcoming 303(d) list. I have been through the .pdf files as well as the text files that make their way into word and excel. This has revealed metadata, station occupation date, results and maps. I was wondering if you had another file that provided a narrative description of the different station numbers to compliment the maps? I need more exact water body names for identification.
>
> I am hoping to use data from Winter Micro, Summer 98, Storm Event and Sed Tox and would greatly appreciate your assistance.
>
> Thank you in advance for your time,
>
> -jimmy
>
> J. G. Smith
> Environmental Specialist
> Region 9 Water Quality Control Board
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From: Keri Cole
To: James Smith
Date: Thu, Jun 7, 2001 4:10 PM
Subject: welcome back

hey jimmy

hope Berkeley was cool.

so here are some things you can be working on

i updated the spreadsheet (see attached).
the TSMP data that i just received for 1999 needs to be added. i also eft a stack of data that needs to be put in our files.
we still need to determine if there is any information which may be useful to us from the Bight 98 study. were you able to locate the stations? summary of toxicity? perhaps you can call Ken Schiff or Steve Bay at SCCWRP and talk to them about it. they may be able to narrow the search/point you in the right direction. they are both very cool and very familiar with the whole 303d impairments.

we also need to put together a cost estimate for the shipyard work. we need to get sampling and analysis costs for each of the items we included in our guidelines. at that meeting with everyone on May 23rd, Steve Bay and Lisa from MEC threw out a few numbers for various analyses (e.g. 7-100 sediment chem, 700-800 toxicity, etc. can you take a crack at putting one together. perhaps you know these types of costs, can check with colleagues, or check with Alan for people to contact. it would be good to try and get independent costs so we can verify what is presented to us later.

we also need to work on the tissue residue guidelines, but that'll have to wait til i can reach New York DEQ.

anyway that should definitely t keep you busy...yikes on a Friday, too!

have a good weekend. see you monday.
kc

From: Del Rasmussen
To: Keri Cole
Date: Thu, Jun 7, 2001 3:34 PM
Subject: Re: tsmp data

Keri,

Linda Pardy has all the recent data for TSM. She is your regional contact for the Program. The only reason I would like you to contact her first is that it is important to me that she aware how the data is being used so if I need to know she can tell me. If you can't get a hold of her, please let me know and I'll dig up the files for you. I don't yet have the lat-longs for the new stations sampled in 1999.

Del Rasmussen
Assessment Unit
Division of Water Quality
State Water Resources Control Board
(916) 341-5545
rasmd@dwq.swrcb.ca.gov

>>> Keri Cole 06/07/01 01:57PM >>>
Hi Del
I met you up at the ArcView training. Remember me?

Anyway, can you send me a copy of the TSMP data for 1999.

Thank you.

Keri Cole, P.E.
Water Resource Control Engineer
San Diego RWQCB
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San Diego, CA 92124
(858) 467-2798
colek@rb9.swrcb.ca.gov

From: Jeremy Haas
To: Keri Cole
Date: Thu, Jun 7, 2001 1:12 PM
Subject: Re: Orange County 303(d) waters

Monday's great. I'll be in all day.

>>> Keri Cole 06/07/01 12:13PM >>>
unfortunately i am out of the office tomorrow. but how about Monday?

you are definitely on my list of people to talk to about this (see your name under Aliso/San Juan creeks in the attached).
attached is a copy of a spreadsheet we have been creating to track all the info we have gotten/are getting/hopefully will get for 303d. it is a working document, but it kinda shows you where we're at. we have not yet reviewed/evaluated any of the data, but hope to in the very near future, starting next week.

thanks.
kc

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>>> Jeremy Haas 06/07/01 11:27AM >>>
Keri,
Do you have anytime tomorrow to talk about potential 303(d) waters in Orange County?
I have NPDES data that might be useful.

Jeremy

From: "Gary Gilbreath" <garyg@water.ca.gov>
To: "'Keri Cole'" <colek@rb9.swrcb.ca.gov>
Date: Thu, Jun 7, 2001 11:12 AM
Subject: RE: Monitoring Data

this might help you

-----Original Message-----
From: Keri Cole [mailto:colek@rb9.swrcb.ca.gov]
Sent: Thursday, June 07, 2001 10:51 AM
To: garyg@water.ca.gov
Cc: Linda Pardy
Subject: RE: Monitoring Data

hi gary
thanks i found the dates on those files you sent to linda pardy on 5/4/01.

can you please forward me the data files for these same stations for July 1997 to most recent. we need this information for our 303d evaluation.
thank you.

STA_NUM	StationName
X2135000	S M R NR FLBRK
X2135000	S M R NR FLBRK
X2135000	S M R NR FLBRK
X2135000	S M R NR FLBRK
X2135000	S M R NR FLBRK
X4340005	ESCNDO nr H GRV
X4340005	ESCNDO nr H GRV
X4340005	ESCNDO nr H GRV
X4340005	ESCNDO nr H GRV
X4340005	ESCNDO nr H GRV
X5123030	SD RVR @ OMD
X5123030	SD RVR @ OMD
X5123030	SD RVR @ OMD
X5123030	SD RVR @ OMD
X5123030	SD RVR @ OMD

Keri Cole, P.E.
Water Resource Control Engineer
San Diego RWQCB
9771 Clairemont Mesa Blvd., Suite A
San Diego, CA 92124
(858) 467-2798
colek@rb9.swrcb.ca.gov

>>> "Gary Gilbreath" <garyg@water.ca.gov> 05/09/01 08:44AM >>>
I see a date file in the db I sent out. all my field books are loaded up right now, I will fax you out of the books the location maps, when I finish this months sampling, these station were ampled every three months, years back, now bi-annully, but it looks like they will be dropped, as all of our surface water sampling stations will be as they (management) probably will go to ground water, a letter will be sent shortly to Linda, it is being

prepared know, our old management used to go out and get work from the board, thay are gone now, and because the frequency of sampling has been dropped, management feels the data is not of much use, and it is only standard minerals, look in attached file, should be a date field. Data here is sent to various agencies and is available to the public by request GG

-----Original Message-----
From: Keri Cole [mailto:colek@rb9.swrcb.ca.gov]
Sent: Friday, May 04, 2001 1:37 PM
To: garyg@water.ca.gov
Subject: Monitoring Data

Hi Gary
Linda Pardy, in our office, recently forwarded me some monitoring data for the Santa Margarita River, San Diego River and Escondido Creek (see attached file). I have been unsuccessful in determining the dates of the sampling. Can you help me out? I am also interested in finding out exactly where the sampling stations are. Can you provide this to me? Do you have a map of the sampling locations? What is the frequency of this data? What purposes is it used for on your end?

The reason I am asking all of this is because we are currently soliciting for additional information and data that may support updates to our 303d list of impaired waterbodies in the region (see attached correspondence). I would be interested in looking at this monitoring data from July 1997 if it is available?

Thanks in advance for your assistance.

Keri Cole, P.E.
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(858) 467-2798
colek@rb9.swrcb.ca.gov

>>> "Gary Gilbreath" <garyg@water.ca.gov> 05/04/01 09:16AM >>>
most recent and historical swq

Gary Gilbreath
Dept. of Water Resources
Water Resources Engineering Associate
770 Fairmont Ave Ste 102
Glendale, Ca 91203-1035
WP-818-543-4653
Fax-818-543-4604
e-mail; garyg@water.ca.gov
web page; http://wwwdpla.water.ca.gov/sd

From: "Gary Gilbreath" <garyg@water.ca.gov>
To: "'Keri Cole'" <colek@rb9.swrcb.ca.gov>
Date: Thu, Jun 7, 2001 11:09 AM
Subject: FW: sw data

Blankhope this works, let me know GG

-----Original Message-----
From: Brian Moniz [mailto:bmoniz@water.ca.gov]
Sent: Tuesday, May 15, 2001 9:39 AM
To: garyg (E-mail)
Subject: sw data

Gary,

Sorry, I forgot to get back to you on the surface water monitoring data file. Here is a zipped version for you as you requested. I'm sorry it took so long.

Brian

Brian C. Moniz
Engineer, Water Resources

State of California
Department of Water Resources
Southern District
770 Fairmont Avenue, Suite 102
Glendale, CA 91203-1035

Phone: (818) 543-4661
FAX: (818) 543-4604
E-mail: bmoniz@water.ca.gov
Website: http://www.dpla.water.ca.gov/sd/

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From: Linda Pardy
To: Keri Cole
Date: Thu, Jun 7, 2001 10:46 AM
Subject: Re: tsmp data 1998

Keri, Here's 1998 TSMP data for Region 9. Please call Del Rasmussen for 1999 and 2000 TSMP data, as I can't seem to find these results in my files. Del is the SB manager in charge of the TSM Program. Also as far as I know DFG has not collected the 2001 fish yet, but I'm expecting the DFG crew to sample fish here in Region 9 next week. -Linda

>>> Keri Cole 06/07/01 10:31AM >>>
hey linda
do you have the electronic tsmp files for 1998, 1999, 2000? I have 1997 and 2001.
thanks.
keri

CC: Del Rasmussen

303d Listing Meeting
AGENDA

June 4, 2001

A. Schedule   copy of schedule → August mtg changed to July
still try to have workshop in mid Aug.

B. Data Received/Organization/Fact Sheets — see spreadsheet
needs update
list all we have
still in house
SW permits
discharge reports

FACT SHEETS
Jimmy & KC first stab

C. Criteria for Listing/Delisting

D. Statewide mini workgroups

E. Other?

still difficult
# of data points

EPA
AZ DEQ

Lisa nutrients

look @ data and see what we've got

weight of evidence

e.g. BPTCP

- separate by pollutants

- based on land use

From: Stefan Lorenzato
To: Becker, Melinda; Bishop, Jonathan ; Curtis, Chuck; Grober, Les; Gwynne, Bruce; Jayne, Deborah; Karkoski, Joe; Leland, David; Levy, Michael; McCann, Lisa; McClure, Daniel; Monji, Alan; Mumley, Thomas; Newkirk, Teresa; Smythe, Hope; Unsicker, Judith
Date: Wed, May 30, 2001 2:31 PM
Subject: Listing considerations workgroup members.

Attached is a list of the folks who said they would participate in workgoups to develop considerations for listing for the various parameter categories. Please check it over and send me any revisions needed.

I have not yet been able to determine which DWQ staff will facilitate the discussions. I hope to get that settled next week so we can get these groups working asap.

stefan

CC: Ali, Syed; Barksdale, Pamela; Beaulaurier, Diane; Frantz, Greg; Kassel, Jim; Levy, Michael; Lorenzato, Stefan; Rao, Linda; Richard, Nancy; Wilson, Craig J.

Listing Considerations Work Group Participants

Pathogens

Joan Brackin – R9
Farhad Ghodrati – R2
Deborah Neiter – R8
Mariela Carpio – R7
Josse Cortez – R7

Bioaccumulation

Alan Monji - R9
Fred Hetzel – R2
Bruce Gwynne – R1
Pavlova Vitale – R8
Teresa Newkirk – R7
Mariela Carpio – R7
Francisco Costa – R7

Sediments

Keri Cole – R9
Mike Napolitano – R2
Bryan McFadin – R1
Lance Lin – R8
Cindy Li – R8
Danny McClure – R7
Francisco Costa – R7

Toxicity, habitat, aquatic community structure

Alan Monji – R9
Linda Pardy – R9
Judith Uniscker – R6
Mike Napolitano – R2
Bill Johnson – R2
Steve Moore – R2
Doug Shibberu – R8
Deborah Neiter – R8
Teresa Newkirk – R7
Mariela Carpio – R7

Nutrients, algal blooms

Lisa Brown – R9
Judith Unsicker –R6
Jeff Church – R1
Cindy Li – R8
Lance Lin – R8

Francisco Costa – R7
Mariela Carpio – R7

Metals
Kyle Olewnik – R9
Richard Looker – R2
Mariela Carpio – R7
Jose Cortez – R7

Pesticides
Linda Pardy – R9
James Smith – R9
Bill Johnson – R2
Doug Shibberu – R8
Mariela Carpio – R7
Francisco Costa – R7

Other chemicals
Fred Hetzel – R2
Pavlova Vitale – R8
Mariela Carpio – R7
Jose Cortez – R7

Temperature
Mike Napolitano – R2
Matt St. John – R1
Danny McClure – R7
Francisco Costa – R7

Trash, settlable solids (other than sediment), floatables, scums
Linda Pardy – R9
Danny McClure – R7
Francisco Costa – R7.

RWQCB Review/Evaluate Staff	WATERSHED		WATERBODY	LOCATION			POTENTIAL POLLUTANT	POTENTIAL DATA/INFO SOURCE				RWQCB Contact	Data	How to proceed
	No.	Name		Hydrogeologic Unit No.	Narrative Description	Length/Area		Document Title	Date Rec'd	Dates of Sampling	Contact			
JIMMY	1	San Juan												
			Numerous Locations in Orange Co	901.00	coastline		bacteria	County of Orange Health Care Agency Beach Closures 97-98 and 1999, 2000 and 2001	5/15/01		Monica Mazur, OC DEH (714) 667-3751	K. Cole	✓	review data
			Aliso Beach	901.10	coastline		bacteria	Orange Co Environmental Health - Beach Closures for 2000	5/15/01		Monica Mazur, OC DEH (714) 667-3751	K. Cole		review data
				901.10	3 riffles upstream of Pacific Park Drive		BMI	SDRWQCB: 1999 Biological Assessment Annual Report	in house	May, Sep & Nov 98, May 99 for most sites	James M. Harrington jharring@ospr.dfg.ca.gov		✓	review data
				901.10	5 riffles parallel to Country Club Rd upstream of Hwy 1		BMI	SDRWQCB: 1999 Biological Assessment Annual Report	in house	May, Sep & Nov 98, May 99 for most sites	James M. Harrington jharring@ospr.dfg.ca.gov		✓	review data
				901.10	2 sites: along Country Club Rd and at Pacific Park Dr/Oso Pkwy		nutrients, TDS, turbidity	"Linda Pardy Sheet 1"	in house	6/10/98	SDRWQCB 1998 sampling		✓	review data. see 3/5/01 email to Tracy Weddle @NPS from L. Pardy. Check with pardy to see if there is more.
				901.10	5 sites: at Cooks Corner, d/s English Cyn, d/s Dairy Fork & Aliso Hills Ch., d/s Sulphur Creek, @ PCH Bridge		Tox testing suspects organophosphate pesticides, Coliforms	Aliso Creek Water Planning Study	in house	11/8/98 & 1/20/99		Jeremy Haas	yes	Are two tox tests on two dates sufficient to show impairment? Coliform currently listed at mouth and in general, for "1 mile"
				901.10	ACJ01	29.7 sq mi	turbidity, metals	Orange Co Municipal Stormwater NPDES Permit Data	in house	8/27/91 - 6/30/00		Jeremy Haas	yes	review data
				901.10	at Pacific Park Dr		Trace elements and Organic Chemicals in Fish and Clams	Toxics Substance Monitoring Program - 1999	in house	Aug-99	D. Rassmussen	L. Pardy	✓	review data
			Dana Point Harbor	901.14	coastline		bacteria	Orange Co Environmental Health - Beach Closures for 2000	5/15/01		Monica Mazur, OC DEH (714) 667-3751	K. Cole	✓	review data
				901.14	DAPTEB, DAPTWB, DAPLTR, DAPTLB, DAPTHE		metals, organics	Orange Co Municipal Stormwater NPDES Permit Data		8/29/91 - 6/7/00		Jeremy Haas	yes	review data
			Laguna Beach	901.12	coastline		bacteria	Orange Co Environmental Health - Beach Closures for 2000	5/15/01		Monica Mazur, OC DEH (714) 667-3751	K. Cole	✓	review data
			Laguna Canyon Channel	901.12	at Woodland Ave (LCW102)	8.3 sq mi	Metals	Orange Co Municipal Stormwater NPDES Permit Data	in house	3/2/92 - 12/16/95		Jeremy Haas	✓	review data
			Oso Creek	901.21			TDS, nutrients	submitted data	3/27/01	Jan 98 - Jan 01	Bob Jordan, Santa Margarita WD	K. Cole	✓	Review data submitted.
				901.21	at Crown Valley Parkway	14.0 sq mi	metals,	Orange Co Municipal Stormwater NPDES Permit Data		8/27/91 - 5/20/99		Jeremy Haas	yes	review data
			Prima Deshecha	901.31	at Calle Grande Vista	7.0 sq mi	metals, organics	Orange Co Municipal Stormwater NPDES Permit Data	in house	8/27/1991-6/30/00		Jeremy Haas	yes	review data
				901.31	Creek enters ocean 100' south of S15		bacteria	South East Regional Reclamation Authority (SERRA) monitoring	in house	6/5/00 - 1/30/01 and earlier		Jeremy Haas	yes	review data
			Salt Creek	901.140 & 910.200				Letter from Bay Keepers	5/15/01		Bruce Reznik		✓	review data

RWQCB Review/Evaluate Staff	WATERSHED		WATERBODY	LOCATION			POTENTIAL POLLUTANT	POTENTIAL DATA/INFO SOURCE					Data	How to proceed
	No.	Name		Hydrogeologic Unit No.	Narrative Description	Length/Area		Document Title	Date Rec'd	Dates of Sampling	Contact	RWQCB Contact		
JIMMY	1	San Juan (continued)	San Juan Creek	901.20				modeling study re: Capistrano Valley WD	in house		Mr. David Zoutendyke USFWLS	L. Pardy		See letter to Linda Pardy. Check w./ Paul Lemmons fro study. See KC emails. Discuss w/ Jeremy Haas.
				901.20			organics	Toxics Substance Monitoring Program - 2000	in house	Jul-00	D. Rassmussen	L. Pardy	✓	
				901.250 thru 901.280	2 sites: at La Nova (SJNL01) and at Ortega (SJOL01)		metals	Orange Co Municipal Stormwater NPDES Permit Data	in house	2/7/92 - 5/31/00 & 7/21/93 - 5/31/00		Jeremy Haas	yes	review data
				901.25			Coliform and Nutrients	USDA Forest Service Smapling Report	6/27/01	June and Oct, 1998	Ron Wright, USDA Forest Service	Jimmy/Keri	yes	review data
				901.250 thru 901.280	at Arroyo Trabuco Creek. 5 riffles w/in Gravel Yard at end of Avery Parkway		BMI	SDRWQCB: 1999 Biological Assessment Annual Report	in house	Sep & Nov 98, May 99	James M. Harrington jharring@ospr.dfg.ca.gov		✓	review data
				901.250 thru 901.280	5 riffles upstream of Hwy 74		BMI	SDRWQCB: 1999 Biological Assessment Annual Report	in house	Sep & Nov 98, May 100	James M. Harrington jharring@ospr.dfg.ca.gov		✓	review data
			San Mateo Creek	901.40	at San Onofre		nitrate, trace elements, TDS, surfactants, bacteria	Disc 1: LAW - Crandall	5/18/01	12/9/97	Lawrence E. Carlson Office of Water Resources, Camp Pendleton	K. Cole	✓	review data
			Segunda Deshecha	901.31 ?	at El Camino Real	8.9 sq mi	metals	Orange Co Municipal Stormwater NPDES Permit Data		8/27/91 - 6/30/00		Jeremy Haas	yes	review data
				901.31?	Creek enters ocean 200' north of S17		bacteria	South East Regional Reclamation Authority (SERRA) monitoring	in house	6/5/00 - 1/30/01 and earlier		Jeremy Haas	yes	review data
			Sulphur Creek	901.13	SCDAM		metals	Orange Co Municipal Stormwater NPDES Permit Data		3/5/92 - 4/21/96		Jeremy Haas	yes	review data
			Arroyo Trabuco Creek	901.20	TCOL02		metals	Orange Co Municipal Stormwater NPDES Permit Data		3/19/94 - 5/20/99		Jeremy Haas	yes	review data
			Arroyo Trabuco Creek	901.20			Coliform and Nutrients	USDA Forest Service Smapling Report	6/27/01	June and Oct, 1998	Ron Wright, USDA Forest Service	Jimmy/Keri	yes	review data

RWQCB Review/Evaluate Staff	WATERSHED		WATERBODY	LOCATION			POTENTIAL POLLUTANT	POTENTIAL DATA/INFO SOURCE					Data	How to proceed
	No.	Name		Hydrogeologic Unit No.	Narrative Description	Length/Area		Document Title	Date Rec'd	Dates of Sampling	Contact	RWQCB Contact		
KERI/LISA	2	Santa Margarita												
			Deluz Creek	902.21			metals & organics	Toxics Substance Monitoring Program - 1998	in house	Jul-00	D. Rassmussen	L. Pardy	✓	review data
				902.21	At Fallbrook		nitrate, trace elements, TDS, surfactants, bacteria	Disc 1: LAW - Crandall	5/18/01	12/9/97	Lawrence E. Carlson Office of Water Resources, Camp Pendleton	K. Cole	✓	review McKenney's data/info.
			Fallbrook Creek	?	Near Fallbrook		nitrate, trace elements, TDS, surfactants, bacteria	Disc 1: LAW - Crandall	5/18/01	12/9/97	Lawrence E. Carlson Office of Water Resources, Camp Pendleton	K. Cole	✓	review data
			Ground Water Santa Margarita River At De Luz Rd	902.100 & 902.200	12.11 ft		nitrate, trace elements, TDS, surfactants, bacteria	Disc 1: LAW - Crandall	5/18/01	1/5/98 thru 12/7/99	Lawrence E. Carlson Office of Water Resources, Camp Pendleton	K. Cole	✓	review data
			Surface & Ground Water, Cristianitos Creek	901.40	12.13 ft		nitrate, trace elements, TDS, surfactants, bacteria	Disc 1: LAW - Crandall	5/18/01	12/9/97	Lawrence E. Carlson Office of Water Resources, Camp Pendleton	K. Cole	✓	review data
			Ground Water, De Luz Creek	902.21	19.04 ft		nitrate, trace elements, TDS, surfactants, bacteria	Disc 1: LAW - Crandall	5/18/01	12/9/97	Lawrence E. Carlson Office of Water Resources, Camp Pendleton	K. Cole	✓	review data
			Lake Skinner	902.42			copper	see Halwee Res TMDL				L. Pardy		review data
			Murrieta Creek	902.520 & 902.300	At Temecula		nitrate, trace elements, TDS, surfactants, bacteria	Disc 1: LAW - Crandall	5/18/01	12/9/97	Lawrence E. Carlson Office of Water Resources, Camp Pendleton	K. Cole	✓	review data
				902.520 & 902.300	at Calle Del Oso Rd		nutrients, TDS, turbidity	"Linda Pardy Sheet 1"	in house	6/9/98	SDRWQCB 1998 sampling		✓	review data. see 3/5/01 email to Tracy Weddle @NPS from L. Pardy. Check with pardy to see if there is more.
				902.520 & 902.300	behind cement factory		nutrients, TDS, turbidity	"Linda Pardy Sheet 1"	in house	6/9/98	SDRWQCB 1998 sampling		✓	review data. see 3/5/01 email to Tracy Weddle @NPS from L. Pardy. Check with pardy to see if there is more.
				902.520 & 902.300	u/s Temecula Cr		Trace elements and Organic Chemicals in Fish and Clams	Toxics Substance Monitoring Program - 1999	in house	8/26/99	D. Rassmussen	L. Pardy	✓	review data
				902.52			Nutrients, Flow, Tox, %Na, TDS	NPDES discharge compliance monitoring data	in house		Rancho Water District EMWD	C.Clemente A. Luptz	yes	review data
			Rainbow Creek	902.20	Near Fallbrook		nitrate, trace elements, TDS, surfactants, bacteria	Disc 1: LAW - Crandall	5/18/01	12/9/97	Lawrence E. Carlson Office of Water Resources, Camp Pendleton	K. Cole	✓	review data
				902.20	at Willow Glen Rd		nutrients, TDS, turbidity	"Linda Pardy Sheet 1"	in house	6/9/98	SDRWQCB 1998 sampling		✓	review data. see 3/5/01 email to Tracy Weddle @NPS from L. Pardy. Check with pardy to see if there is more.
				902.20			Trace elements and Organic Chemicals in Fish and Clams	Toxics Substance Monitoring Program - 1999	in house	Aug-99	D. Rassmussen	L. Pardy	✓	review data
			Sandia Creek	902.22	Near Fallbrook		nitrate, trace elements, TDS, surfactants, bacteria	Disc 1: LAW - Crandall	5/18/01	12/9/97	Lawrence E. Carlson Office of Water Resources, Camp Pendleton	K. Cole	✓	review data
				902.22	at Sandia Ck Rd (0.5 to 1 mile above confluence)		nutrients, TDS, turbidity	"Linda Pardy Sheet 1"	in house	6/9/98	SDRWQCB 1998 sampling		✓	review data. see 3/5/01 email to Tracy Weddle @NPS from L. Pardy. Check with pardy to see if there is more.
				902.22			metals & organics	Toxics Substance Monitoring Program - 1998	in house	Jul-00	D. Rassmussen	L. Pardy	✓	review data

RWQCB Review/Evaluate Staff	WATERSHED		WATERBODY	LOCATION			POTENTIAL POLLUTANT	POTENTIAL DATA/INFO SOURCE					Data	How to proceed
	No.	Name		Hydrogeologic Unit No.	Narrative Description	Length/Area		Document Title	Date Rec'd	Dates of Sampling	Contact	RWQCB Contact		
KERI/LISA	2	Santa Margarita (continued)	Santa Margarita River	902.10 & 902.20			nutrients, TDS, turbidity	DWR elec file	in house		Gary Gilbreath, Dept. of Water Resources	L. Pardy	✓	Review data submitted. Obtain other files submited to Linda. Obtain sample locations from Gary. See email to KC.
				902.10 & 902.21	4 sites: at Willow Glen Rd (Stage Coach Lane), at DeLuz Rd near Sandia Ck, below diversion weir on Camp Pendleton & at Stuart Mesa Rd bridge on Camp Pendleton		nutrients, TDS, turbidity	"Linda Pardy Sheet 1"	in house	6/9/98	SDRWQCB 1998 sampling		✓	review data. see 3/5/01 email to Tracy Weddle @NPS from L. Pardy. Check with pardy to see if there is more.
				902.10 & 902.21			nutrients, bacteria, SEDIMENT	WQ Studies & Prop. Watershed Monitoring Program for Portions of San Mateo & Santa Margarita River Watersheds, July 2000	in house		Rancho Water District EMWD Larry McKenney, Camp Pendelton	D.Gibson J.Robertus L.Brown	✓	review data
				902.10 & 902.20	Near USGS Gauging Station 11044300		nitrate, trace elements, TDS, surfactants, bacteria	Disc 1: LAW - Crandall	5/18/01	12/9/97 & 3/3/98	Lawrence E. Carlson Office of Water Resources, Camp Pendleton	K. Cole	✓	review data
				902.10 & 902.20	Near Temecula		nitrate, trace elements, TDS, surfactants, bacteria	Disc 1: LAW - Crandall	5/18/01	12/9/97	Lawrence E. Carlson Office of Water Resources, Camp Pendleton	K. Cole	✓	review data
				902.100 & 902.200	at Ysidora		nitrate, trace elements, TDS, surfactants, bacteria	Disc 1: LAW - Crandall	5/18/01	12/9/97	Lawrence E. Carlson Office of Water Resources, Camp Pendleton	K. Cole	✓	review data
				902.100 & 902.200			sediments	Santa Margarita River Hydrology, Hydraulics and Sedimentation Study - Disc 2 (West Consultants Inc)	5/18/01		Lawrence E. Carlson Office of Water Resources, Camp Pendleton	K. Cole	✓	review data
				902.10 & 902.20	at Willow Glen Rd, at De Luz and at the Estuary		nutrients, bacteria	Rancho Cal Water District - Summary and Analysis of Year 2000 Data Receiving Water Stations 1-4	4/25/01	Mar - Dec 2000	Brian Kelley, Kenneth C. Dealy (Rancho Water)	A.Laputz	✓	meet w/ Adma Laputz to discuss available/useful data
				902.10 & 902.20	9 locations including Murrietta Crk, Temecula Crk, Rainbow Crk, Sandia Crk		BMI	SDRWQCB: 1999 Biological Assessment Annual Report	in house	May, Sep & Nov 98, May 99 for most sites	James M. Harrington jharring@ospr.dfg.ca.gov		✓	review data
				902.10 & 902.20	at Camp Pendleton Treatment facilities		Nutrients, TDS, bacteria	NPDES discharge compliance monitoring data	in house		Cam Pendleton	C.Clemente	yes	review data
				902.11	1999 sampling at Stuart Mesa Rd		metals & organics	Toxics Substance Monitoring Program - 1997 and 1999	in house	6/1/1997 and 8/25/99	D. Rassmussen	L. Pardy	✓	review data
			Temecula Crk	902.500 thru 902.900	east of confluence, west of I-15		nutrients, TDS, turbidity	"Linda Pardy Sheet 1"	in house	6/9/98	SDRWQCB 1998 sampling		✓	review data. see 3/5/01 email to Tracy Weddle @NPS from L. Pardy. Check with pardy to see if there is more.

RWQCB Review/Evaluate Staff	WATERSHED		WATERBODY	LOCATION			POTENTIAL POLLUTANT	POTENTIAL DATA/INFO SOURCE					Data	How to proceed
	No.	Name		Hydrogeologic Unit No.	Narrative Description	Length/Area		Document Title	Date Rec'd	Dates of Sampling	Contact	RWQCB Contact		
ALAN	3	San Luis Rey	Lake Henshaw	903.31			bacteria?				Julie Alpert (619) 473-9669			Contacted J. Alpert, Call Jarad and Mary Aldern (619) 782-9038
			San Luis Rey River	903.100 thru 903.200	at Foussat Rd		nutrients, TDS, turbidity	"Linda Pardy Sheet 1"	in house	5/20/98	SDRWQCB 1998 sampling		✓	review data. see 3/5/01 email to Tracy Weddle @NPS from L. Pardy. Check with pardy to see if there is more
				903.100 thru 903.200	at Old Hwy 395		nutrients, TDS, turbidity	"Linda Pardy Sheet 1"	in house	6/11/98	SDRWQCB 1998 sampling		✓	review data. see 3/5/01 email to Tracy Weddle @NPS from L. Pardy. Check with pardy to see if there is more
				903.100 thru 903.200	4 sites: Bonsall Bridge, Douglas Bridge, Benet Rd, and Mixing Zone		bacteria, virus	City of Oceanside Water Utilities Lab	in house	Jan 1999 - April 01	Guss Pennell (760) 966-4850		yes	review data
				903.100 thru 903.200	5 Riffles up and downstream of Lilac Rd		BMI	SDRWQCB: 1999 Biological Assessment Annual Report	in house	May, Sep & Nov 98, May 99	James M. Harrington jharring@ospr.dfg.ca.gov		✓	review data
				903.100 thru 903.200	50m upstream of pullout opposite Outdoor Ed School on Hwy 76		BMI	SDRWQCB: 1999 Biological Assessment Annual Report	in house	May, Sep & Nov 98, May 99	James M. Harrington jharring@ospr.dfg.ca.gov		✓	review data
				903.100 thru 903.200	3 riffles upstream of old Hwy 395 and I-15		BMI	SDRWQCB: 1999 Biological Assessment Annual Report	in house	May, Sep & Nov 98, May 99	James M. Harrington jharring@ospr.dfg.ca.gov		✓	review data
				903.100 thru 903.200	3 riffles upstream of Mission Rd		BMI	SDRWQCB: 1999 Biological Assessment Annual Report	in house	May, Sep & Nov 98, May 99	James M. Harrington jharring@ospr.dfg.ca.gov		✓	review data
				903.00			nutrients, bacteria, sediment				Vista Irrigation District	D. Gibson		Contact Vista Irrigation District for info/data?

RWQCB Review/Evaluate Staff	WATERSHED No.	WATERSHED Name	WATERBODY	LOCATION Hydrogeologic Unit No.	LOCATION Narrative Description	LOCATION Length/Area	POTENTIAL POLLUTANT	POTENTIAL DATA/INFO SOURCE Document Title	Date Rec'd	Dates of Sampling	Contact	RWQCB Contact	Data	How to proceed
KERI/LINDA/LESLIE	4	Carlsbad												
			Agua Hedionda Creek	904.30			bacteria, pesticides, pathogens	SW monitoring report	in house			D. Gibson	✓	Review SW monitoring reports.
				904.30	near El Camino Real		Trace elements and Organic Chemicals in Fish and Clams	Toxics Substance Monitoring Program - 1999	in house	Aug-99	D. Rassmussen	L. Pardy	✓	review data
				904.30	3 sites: at Sycamore Ave, at El Camino Real & 'generic site'		nutrients, TDS, turbidity	"Linda Pardy Sheet 1"	in house	6/10/98	SDRWQCB 1998 sampling		✓	review data. see 3/5/01 email to Tracy Weddle @NPS from L. Pardy. Check with pardy to see if there is more.
				904.30	5 riffles upstream of Sycamore ave & 5 riffles downstream of El Camino Real		BMI	SDRWQCB: 1999 Biological Assessment Annual Report	in house	May, Sep & Nov 98, May 99	James M. Harrington jharring@ospr.dfg.ca.gov		✓	review data
			Agua Hedionda Lagoon	904.31			bacteria		Discussed 3/30/01			P. Michael	✓	Review 1997 BPTCP for lagoons, per Pete Michael. Changes in current listing?
				904.31	3 basins		coliforms, water quality, mussels, co-permittee DNA work, seds, coliform	Conversations with Chiara Clemente regarding her intern work and other	Discussed 6/12/01			C. Clemente	✓	Review data from Chiara
				904.31			copper, zinc	H-SWRI / OREHP = Report of Waste Discharge Agua Hedionda Lagoon Fish Hatchery		10/31/00, 11/08/00, 11/13/00			✓	review data
				904.31			Caulerpa	E-mail conversations				L. Dobelian		Sent email to L. Dobelian. Contacted Steve Moore at Reg 2 re: submittal of exotic TMDL to EPA. Contacted J. Richards re:legality of 303d for exotic. See emails.
			Batiquitos Lagoon	904.51	S. Carlsbad St Beach - Hwy 101 Drainage Channel		diazinon, chlorpyrifos, malathion	City of Encinitas Municipal Stormwater Permit Compliance Report (90-42)		2/16/00	Kerry Miller, City Manager		✓	review data
				904.51	Leucadia Blvd at El Camino Real		diazinon, malathion	City of Encinitas Municipal Stormwater Permit Compliance Report (90-42)		1/25/00	Kerry Miller, City Manager		✓	review data
				904.51	El Camino Real at Gardenview Rd		diazinon, malathion, prowl	City of Encinitas Municipal Stormwater Permit Compliance Report (90-42)		1/25/00	Kerry Miller, City Manager		✓	review data
				904.51	La Costa Ave at Saxony Rd		diazinon	City of Encinitas Municipal Stormwater Permit Compliance Report (90-42)		2/23/00	Kerry Miller, City Manager		✓	review data
			Buena Vista Creek	904.32	5 riffles downstream of Santa Fe Ave & 5 riffles upstream of S. Vista Way		BMI	SDRWQCB: 1999 Biological Assessment Annual Report	in house	May, Sep & Nov 98, May 99	James M. Harrington jharring@ospr.dfg.ca.gov		✓	review data
				904.32	2 sites: at South Vista Way, at Wildwood Park & 'generic site'		nutrients, TDS, turbidity	"Linda Pardy Sheet 1"	in house	5/20/98	SDRWQCB 1998 sampling		✓	review data. see 3/5/01 email to Tracy Weddle @NPS from L. Pardy. Check with pardy to see if there is more.
			Buena Vista Lagoon	4.21			nutrients, warm, sedimentation		in house			G. Peters	✓	Review 1997 BPTCP for lagoons, per Pete Michael. Changes in current listing? Discuss w/ Greig Peters.
				904.21			Trace elements and Organic Chemicals in Fish and Clams	Toxics Substance Monitoring Program - 1999	in house	Aug-99	D. Rassmussen	L. Pardy	✓	review data
			Encinitas Creek	904.51	5 riffles downstream of Green Vlly Rd		BMI	SDRWQCB: 1999 Biological Assessment Annual Report	in house	May, Sep & Nov 98, May 99	James M. Harrington jharring@ospr.dfg.ca.gov		✓	review data
				904.51	at Green Valley Rd		nutrients, TDS, turbidity	"Linda Pardy Sheet 1"	in house	6/3/98	SDRWQCB 1998 sampling		✓	review data. see 3/5/01 email to Tracy Weddle @NPS from L. Pardy. Check with pardy to see if there is more.
			Loma Alta Creek	904.10	5 riffles downstream of College Blvd and 5 riffles downstream of El Camino Real		BMI	SDRWQCB: 1999 Biological Assessment Annual Report	in house	May, Sep & Nov 98, May 99	James M. Harrington jharring@ospr.dfg.ca.gov		✓	review data
				904.10	2 stations: at College Blvd & at El Camino Real		nutrients, TDS, turbidity	"Linda Pardy Sheet 1"	in house	5/20/98	SDRWQCB 1998 sampling		✓	review data. see 3/5/01 email to Tracy Weddle @NPS from L. Pardy. Check with pardy to see if there is more
				904.10	near College Blvd		Trace elements and Organic Chemicals in Fish and Clams	Toxics Substance Monitoring Program - 1999	in house	Aug-99	D. Rassmussen	L. Pardy	✓	review data

RWQCB Review/Evaluate Staff	WATERSHED No.	WATERSHED Name	WATERBODY	LOCATION Hydrogeologic Unit No.	LOCATION Narrative Description	LOCATION Length/Area	POTENTIAL POLLUTANT	POTENTIAL DATA/INFO SOURCE Document Title	Date Rec'd	Dates of Sampling	Contact	RWQCB Contact	Data	How to proceed
KERI/LINDA/LESLIE	4	Carlsbad (continued)	Los Penasquitos Creek	906.100 thru 906.200			bacteria, pesticides, pathogens	SW monitoring report	in house			D. Gibson		Review SW monitoring reports? Contact who?
				906.100 thru 906.200	2 sites: upstream of Black Mtn Rd & at Cobblestone Creek Rd		turbidity, TDS, nutrients	"Linda Pardy Sheet 1"	in house	6/3/98	SDRWQCB 1998 sampling		✓	review data. see 3/5/01 email to Tracy Weddle @NPS from L. Pardy. Check with pardy to see if there is more
			Reidy Creek	904.62			nitrogen, phosphorus, turbidity	samples taken	3/30/01	3/12/01		R. Dimenstien	✓	Review data submitted.
			San Elijo Lagoon	904.61	San Elijo Lagoon at Ocean Cove Dr.		diazinon, malathion	City of Encinitas Municipal Stormwater Permit Compliance Report (90-42)	in house	1/25/00	Kerry Miller, City Manager		✓	review data
				904.61	East Manchester at El Camino Real		diazinon, chlorpyrifos	City of Encinitas Municipal Stormwater Permit Compliance Report (90-42)	in house	2/23/00	Kerry Miller, City Manager		✓	review data
			San Marcos Creek	904.50	4 sites		BMI	SDRWQCB: 1999 Biological Assessment Annual Report	in house	May, Sep & Nov 98, May 99	James M. Harrington jharring@ospr.dfg.ca.gov		✓	review data
				904.50	3 sites: at Rancho Santa Fe Rd, at McMahr & at Rancheros Drive		turbidity, TDS, nutrients	"Linda Pardy Sheet 1"	in house	6/3/98	SDRWQCB 1998 sampling		✓	review data. see 3/5/01 email to Tracy Weddle @NPS from L. Pardy. Check with pardy to see if there is more
				904.50			Trace elements and Organic Chemicals in Fish and Clams	Toxics Substance Monitoring Program - 1999	in house	Aug-99	D. Rassmussen	L. Pardy	✓	review data
			San Marcos Lake	904.52	reservoir		oil, trash, others?	Letter and Photos to J. Robertus	14-May-01	Feb & April, 01	Tom Achter (760) 744-4306		✓	review info. Follow up?
								ROWD Fish Hatchery	4/30/01				✓	review data
			Escondido Creek	904.62			diazinon	wet weather monitoring data	Apr - 00		City of Encinitas	L. Pardy	✓	Review letter and data? Need additional? Follow-up with City of Encinitas
				904.62			eutrophication				City of SD, City of Escondido	M. Porter	✓	Review SW monitoring reports? Contact who?
				904.62			turbidity, TDS, nitrates	DWR elec file	5/4/01		Gary Gilbreath, Dept. of Water Resources	L. Pardy	✓	Review data submitted. Obtain other files submited to Linda. Obtain sample locations from Gary. See email to KC.
				904.62	below Harmony Grove Bridge		turbidity, TDS, nutrients	"Linda Pardy Sheet 1"	in house	6/3/98	SDRWQCB 1998 sampling		✓	review data. see 3/5/01 email to Tracy Weddle @NPS from L. Pardy. Check with pardy to see if there is more
				904.62	Elfin Forest at Harmony Grove		turbidity, TDS, nutrients	"Linda Pardy Sheet 1"	in house	6/3/98	SDRWQCB 1998 sampling		✓	review data. see 3/5/01 email to Tracy Weddle @NPS from L. Pardy. Check with pardy to see if there is more
				904.62	?		turbidity, TDS, nutrients, trace elements	"Linda Pardy Sheet 1"	in house	6/29/98	SDRWQCB 1998 sampling		✓	review data. see 3/5/01 email to Tracy Weddle @NPS from L. Pardy. Check with pardy to see if there is more
				904.62	near Elfin Forest Park		Trace elements, diazinon and Organic Chemicals in Fish and Clams	Toxics Substance Monitoring Program - 1999	in house	Aug-99	D. Rassmussen	L. Pardy	✓	review data
				904.62	at La Bajada Dip		diazinon	City of Encinitas Municipal Stormwater Permit Compliance Report (90-42)		4/18/00 & 5/24/00	Kerry Miller, City Manager		✓	review data
				904.62	at Wildflower Drive		diazinon	City of Encinitas Municipal Stormwater Permit Compliance Report (90-42)		4/18/00 & 5/24/00	Kerry Miller, City Manager		✓	review data
				904.62	5 sites: upstream of La Bajada Brdge, at Elfin Forrest Trailer Park, *at Country Club Drive, at the* granite yard, downstream of Harmony Gorve Bridge		Nutrients, pH, TSS, TDS, VSS	Discharge monitoring report in compliance of Order 98-10	in house		Daryl Hill, City of Escondido	C. Clemente	yes	review data
				904.62	5 riffles downstream of Harmony Grove Bridge		BMI	SDRWQCB: 1999 Biological Assessment Annual Report	in house	May, Sep & Nov 98, May 99	James M. Harrington jharring@ospr.dfg.ca.gov		✓	review data
				904.62	5 riffles downstream of Elfin Forest Resort		BMI	SDRWQCB: 1999 Biological Assessment Annual Report	in house	May, Sep & Nov 98, May 99	James M. Harrington jharring@ospr.dfg.ca.gov		✓	review data
				904.62	5 riffles upstream of Rancho Santa Fe Rd		BMI	SDRWQCB: 1999 Biological Assessment Annual Report	in house	May-98	James M. Harrington jharring@ospr.dfg.ca.gov		✓	review data

RWQCB Review/Evaluate Staff	WATERSHED		WATERBODY	LOCATION			POTENTIAL POLLUTANT	POTENTIAL DATA/INFO SOURCE					Data	How to proceed
	No.	Name		Hydrogeologic Unit No.	Narrative Description	Length/Area		Document Title	Date Rec'd	Dates of Sampling	Contact	RWQCB Contact		

RWQCB Review/Evaluate Staff	WATERSHED		WATERBODY	LOCATION			POTENTIAL POLLUTANT	POTENTIAL DATA/INFO SOURCE					Data	How to proceed
	No.	Name		Hydrogeologic Unit No.	Narrative Description	Length/Area		Document Title	Date Rec'd	Dates of Sampling	Contact	RWQCB Contact		
KERI	5	San Dieguito												
			San Dieguito Lagoon	905.11			organics	Toxics Substance Monitoring Program - 2000	in house	Jul-00	D. Rassmussen	L. Pardy	✓	review data
			Kit Carson Creek	905.??			MTBE, Nutrients, TDS, TOC, Coliform, organics	data files submitted by City of San Diego	5/15/01	Jan 96 - Jan 01	Jeff Pasek/Ron Coss, City of SD	D. Gibson	✓	review data
			Del Dios Creek	905.??			TDS. Bacteria, Nutrients	data files submitted by City of San Diego	5/15/01	Jan 96 - Jan 01	Jeff Pasek/Ron Coss, City of SD	D. Gibson	✓	review data
			Felicita Creek	905.23			Organics, Metals, DOC, NH3, NO2, TDS, TOC, TKN, Coliforms, Pesticides	data files submitted by City of San Diego	5/15/01	Jan 96 - Jan 01	Jeff Pasek/Ron Coss, City of SD	D. Gibson	✓	review data
				905.23			metals & organics	Toxics Substance Monitoring Program - 1998	in house	Jul-00	D. Rassmussen	L. Pardy	✓	review data
			Green Valley Creek	905.??			Organics, MTBE, Nutrients, Metals	data files submitted by City of San Diego	5/15/01	Jan 96 - Jan 01	Jeff Pasek/Ron Coss, City of SD	D. Gibson	✓	review data
			Lake Hodges	905.21	reservoir		bacteria?	data files submitted by City of San Diego	5/15/01		Jeff Pasek/Ron Coss, City of SD	D. Gibson	✓	review data
			Sutherland Reservoir	905.53	reservoir		bacteria?	data files submitted by City of San Diego	5/15/01		Jeff Pasek/Ron Coss, City of SD	D. Gibson	✓	review data

RWQCB Review/Evaluate Staff	WATERSHED No.	WATERSHED Name	WATERBODY	LOCATION Hydrogeologic Unit No.	LOCATION Narrative Description	LOCATION Length/Area	POTENTIAL POLLUTANT	POTENTIAL DATA/INFO SOURCE Document Title	Date Rec'd	Dates of Sampling	Contact	RWQCB Contact	Data	How to proceed
JOAN	6	Penasquitos												
			Carroll Cyn Creek	906.1 ?	5 riffles downstream of I-805 & Sorrento Vlly Rd		BMI	SDRWQCB: 1999 Biological Assessment Annual Report		May, Sep & Nov 98, May 99	James M. Harrington jharring@ospr.dfg.ca.gov		✓	review data
			Los Penaquitos Creek	906.100 thru 906.200	2 sites		BMI	SDRWQCB: 1999 Biological Assessment Annual Report	in house	May, Sep & Nov 98, May 99	James M. Harrington jharring@ospr.dfg.ca.gov		✓	review data
			Miramar Reservoir	906.10	reservoir		bacteria?	data files submitted by City of San Diego	5/15/01		Jeff Pasek/Ron Coss, City of SD	D. Gibson	✓	review data
			Mission Bay	906.00			bacteria		in house			C. Clemente, J. Brackin		See Joan re: changes to listing?
			Rose Creek	906.40			metals & organics	Toxics Substance Monitoring Program - 1997	in house	Jun-97	D. Rassmussen	L. Pardy	✓	
			Rattlesnake Creek	902.930 & 906.200	5 riffles adjacent to Hillary Prk		BMI	SDRWQCB: 1999 Biological Assessment Annual Report	in house	May, Sep & Nov 98, May 99	James M. Harrington jharring@ospr.dfg.ca.gov		✓	review data
				902.930 & 906.200	at Hilleary Park (off Community Rd)		nutrients, TDS, turbidity	"Linda Pardy Sheet 1"	in house	6/3/98	SDRWQCB 1998 sampling		✓	review data. see 3/5/01 email to Tracy Weddle @NPS from L. Pardy. Check with pardy to see if there is more
			Tecolote Creek	906.50			organics	Toxics Substance Monitoring Program - 2000	in house	Jul-00	D. Rassmussen	L. Pardy	✓	review data
				906.50			water chemistry				Dr. Kaufman & Dr. Boudrais, USD Josh Garcia		✓	Sent email to Dr. Boudrais/Dr. Kaufman, no response. Hiram from Baykeeper will have him get back to me. Never rec'd info
				906.50	5 riffles upstream of Gardena Ave & Cross St.		BMI	SDRWQCB: 1999 Biological Assessment Annual Report	in house	May, Sep & Nov 98, May 99	James M. Harrington jharring@ospr.dfg.ca.gov		✓	review data
				906.50			bacteria, pesticides, pathogens	SW monitoring report	in house			D. Gibson		Review SW monitoring reports? Contact who?

RWQCB Review/Evaluate Staff	WATERSHED		WATERBODY	LOCATION			POTENTIAL POLLUTANT	POTENTIAL DATA/INFO SOURCE					Data	How to proceed
	No.	Name		Hydrogeologic Unit No.	Narrative Description	Length/Area		Document Title	Date Rec'd	Dates of Sampling	Contact	RWQCB Contact		
JIMMY/ALAN	7	San Diego												
			Alvarado Creek to SD River	907.11	Near Adobe Falls Rd		bacteria	Union Tribune, 14 March 2000, A-1 & A-7		28-Feb-00			✓	review info
			El Capitan Reservoir	907.31			bacteria?	data files submitted by City of San Diego	37026		Jeff Pasek/Ron Coss, City of SD	D. Gibson	✓	review data
			Fanita Creek	?			nutrients, trash	SD River Photographic Tour of a Polluted Watershed - Santee Segment			Van K. Collinsworth		✓	review info
			Forrester Creek	907.13			nutrients, trash	SD River Photographic Tour of a Polluted Watershed - Santee Segment			Van K. Collinsworth		✓	review info
				907.13	1150 Bradley Ave		acid / water / copper mixture 10-20 gallons	Referral - Co of SD Dept of Envrion Health	5/2/01	1-May-01	Bob Griswold, Co of SD DEH		✓	review data
				907.13	1150 West Bradley Ave		NaOH, 1,000 gallons	Letter to J. Medina from R. Odiorne		5-Jul-00	Richard Odiorne, City Engineer, City of El Cajon		✓	review data
				907.13	400' before junction w/ Washington Channel		chlorine, copper, phenol, detergents	City of El Cajon NPDES Field Screen Data		11/1/93 and 11/2/93	Luis Angulo-Landeros, Engineering Technician		✓	review data
				907.13	To the East of City Shops		chlorine, copper, phenol, detergents	City of El Cajon NPDES Field Screen Data		11/1/93 and 11/2/93	Luis Angulo-Landeros, Engineering Technician		✓	review data
				907.13	Marshall & B. Mitchel		chlorine, copper, phenol, detergents	City of El Cajon NPDES Field Screen Data		11/1/93 and 11/2/93	Luis Angulo-Landeros, Engineering Technician		✓	review data
				907.13	N of I-8 btw Magnolia Ave & Johnson Ave		chlorine, copper, phenol, detergents, ammonia	City of El Cajon NPDES Field Screen Data		Sep 94, May 96, Nov 97, Jan 99, June 99, Dec 99, Jan 01 (No June 98?)	Luis Angulo-Landeros, Robert Griswold		✓	review data
				907.13	N of Vernon Way btw Johnson Ave & Marshall Ave		chlorine, copper, phenol, detergents, ammonia	City of El Cajon NPDES Field Screen Data		Sep 94, May 96, Nov 97, June 98, Jan 99, June 99, Dec 99, Jan 01	Luis Angulo-Landeros, Robert Griswold		✓	review data
				907.13	at North City Limit		chlorine, copper, phenol, detergents, ammonia	City of El Cajon NPDES Field Screen Data		Sep 94, May 96, Nov 97, June 98, Jan 99, June 99, Dec 99, Jan 01	Luis Angulo-Landeros, Robert Griswold		✓	review data
			San Vicente Reservoir	907.21			bacteria?	data files submitted by City of San Diego	5/15/01		Jeff Pasek/Ron Coss City of SD	D. Gibson	✓	review data
			Sycamore Cyn Creek	907.12			nutrients, trash	SD River Photographic Tour of a Polluted Watershed - Santee Segment	5/15/01		Van K. Collinsworth		✓	review data
				907.12	5 sites: 2 upstream of Padre Dam, 1 at pt of discharge, 2 downstream		Ntrnts, TDS, Flow, Coliform	Discharge monitoring report in compliance of Order 98-60			Gary Canfield, Padre Dam	Chiara Clemente	yes	
				907.12			nutrients	data files submitted by City of San Diego	5/16/01		Jeff Pasek/Ron Coss City of SD	D. Gibson	✓	review data
			Famosa Slough	907.11			organics	Toxics Substance Monitoring Program - 2000	In house	Jul-00	D. Rassmussen	L. Pardy	✓	review data
			Murray Reservoir	907.11	reservoir		bacteria?	data files submitted by City of San Diego	5/15/01		Jeff Pasek/Ron Coss, City of SD	D. Gibson	✓	review data

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JIMMY/ALAN	7	San Diego (continued)	San Diego River	907.00			turbidity, TDS, nitrates	DWR elec file	in house		Gary Gilbreath, Dept. of Water Resources	L. Pardy	✓	review data
				907.110 thru 907.410			nutrients, trash	SD River Photographic Tour of a Polluted Watershed - Santee Segment			Van K. Collinsworth		✓	review data
				907.11	upstream of Mission Dam		nutrients, TDS, turbidity	"Linda Pardy Sheet 1"	in house	6/2/98	SDRWQCB 1998 sampling		✓	review data. see 3/5/01 email to Tracy Weddle @NPS from L. Pardy. Check with pardy to see if there is more
				907.11	Mission Trails Reg Park		nutrients, TDS, turbidity	"Linda Pardy Sheet 1"	in house	6/2/98	SDRWQCB 1998 sampling		✓	review data. see 3/5/01 email to Tracy Weddle @NPS from L. Pardy. Check with pardy to see if there is more
				907.11	Fashion Valley Rd		nutrients, TDS, turbidity	"Linda Pardy Sheet 1"	in house	6/2/98	SDRWQCB 1998 sampling		✓	review data. see 3/5/01 email to Tracy Weddle @NPS from L. Pardy. Check with pardy to see if there is more
				907.11			nutrients, TDS, turbidity	SWQ data	5/4/01		Gary Gilbreath (818) 543-5653		✓	review data
				907.11			Bacteria	Attachment B of letter re: CWA Section 303(d) Listing	5/15/01	0/97 thru 09/0	Suzanne M. Michel San Diego Baykeeper		✓	review data
				907.11	5 riffles upstream of Mission Dam		BMI	SDRWQCB: 1999 Biological Assessment Annual Report	in house	May, Sep & Nov 98, May 99	James M. Harrington jharring@ospr.dfg.ca.gov		✓	review data
				907.11	5 riffles downstream of boundary of Mission Trails Park		BMI	SDRWQCB: 1999 Biological Assessment Annual Report	in house	May, Sep & Nov 98, May 99	James M. Harrington jharring@ospr.dfg.ca.gov		✓	review data
				907.11	5 riffles adjacent to River Valley Golf Course		BMI	SDRWQCB: 1999 Biological Assessment Annual Report	in house	May, Sep & Nov 98, May 99	James M. Harrington jharring@ospr.dfg.ca.gov		✓	review data
				907.11	Lakeside Wells		MTBE, benzene	MTBE and the Future of Clean Water in Lakeside, California	5/15/01	May thru July, 1999	Tisa Bizzari, Senior Thesis SDSU		✓	review data
				907.11	Lakeside Area		trash, eutrophication, other pollutants	Lakeside - A River Rus Through It Photographic and News Article Tour Potential Source of Data from DF&G Investigation	5/15/01		Diane York (619) 443-3267		✓	review data
				907.11			bacteria	Data Review Attachment A	5/14/01	Oct 97 thru Sep 00	Hiram Sarabia / Susan Michel	K. Cole	✓	review data
				907.11			DO	Fish Kill memo in SD River memo	in house	8/31/00	DFG	L. Brown/G. Peters		review memo. Contact DFG?
				907.11	1999 sampling u/s Taylor St		metals & organics	Toxics Substance Monitoring Program - 1997 and 1999	in house	6/1/1997 and 8/23/99	D. Rassmussen	L. Pardy	✓	

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	No.	Name		Hydrogeologic Unit No.	Narrative Description	Length/Area		Document Title	Date Rec'd	Dates of Sampling	Contact	RWQCB Contact		
KYLE	8	Pueblo												
			Chollas Creek	908.22			trash	pictures	Jan - 2001			K. Olewnik	✓	?
				908.22			organics	Toxics Substance Monitoring Program - 2000	in house	Jul-00	D. Rassmussen	L. Pardy	✓	review data
				908.22	Main Channel at end of Durant St		TDS, nutrients, pesticides, metals	Chollas Creek Water Quality Sampling 1999-2000 Wet-Weather Season	in house	1999-2000	City of SD	B. Tobler/D. Gibson	✓	review data
				908.22	Main Channel - just north of SR 94 and I-15		TDS, nutrients, pesticides, metals	Chollas Creek Water Quality Sampling 1999-2000 Wet-Weather Season	in house	1999-2000	City of SD		✓	review data
				908.22	Main Channel - Home Ave near Police Canine Training Field		TDS, nutrients, pesticides, metals	Chollas Creek Water Quality Sampling 1999-2000 Wet-Weather Season	in house	1999-2000	City of SD		✓	review data
				908.22	South Branch - 38th St Bridge		TDS, nutrients, pesticides, metals	Chollas Creek Water Quality Sampling 1999-2000 Wet-Weather Season	in house	1999-2000	City of SD		✓	review data
				908.22	South Branch - Federal Blvd		TDS, nutrients, pesticides, metals	Chollas Creek Water Quality Sampling 1999-2000 Wet-Weather Season	in house	1999-2000	City of SD		✓	review data
				908.22	South Branch - just south of Jamacha Rd at 69th St		TDS, nutrients, pesticides, metals	Chollas Creek Water Quality Sampling 1999-2000 Wet-Weather Season	in house	1999-2000	City of SD		✓	review data
			7th Street	908.31			organics	Toxics Substance Monitoring Program - 2000	in house	Jul-00	D. Rassmussen	L. Pardy	✓	review data
			Paradise Creek Marsh	908.32			organics	Toxics Substance Monitoring Program - 2000	in house	Jul-00	D. Rassmussen	L. Pardy	✓	review data
			San Diego Bay Harbor Island	908.00			copper				SPAWAR	L. Dobelian	✓	Need to get data from Lesley & Power Plant data from P.Richter. Contact Chuck/Bart at SPAWAR
			San Diego Bay Switzer Creek	908.00			benthic comm, toxicity	BPTCP 1998 Amendment, SW monitoring report			Port Authority	D.Jayne D.Barker P.Michael L.Pardy	✓	Spoke with P. Michael re: source of info. Review BPTCP 1998 addendum.
			San Diego Bay Switzer Creek	908.00				State Mussel Watch 95-97		1995-1997		D.Jayne D.Barker P.Michael L.Pardy	✓	review data
			San Diego Bay	908.00			benthic comm, toxicity	SCCWRP Bight 98 Study			Steve Bay Ken Schiff	P.Michael L.Pardy	✓	review data

RWQCB Review/Evaluate Staff	WATERSHED		WATERBODY	LOCATION			POTENTIAL POLLUTANT	POTENTIAL DATA/INFO SOURCE					Data	How to proceed
	No.	Name		Hydrogeologic Unit No.	Narrative Description	Length/Area		Document Title	Date Rec'd	Dates of Sampling	Contact	RWQCB Contact		
KYLE	9	Sweetwater												
			Loveland Reservoir	909.31			heavy metals, inorganic chems, many other chems	transmittal letter w/ 7/97 - 1/01 monitoring data	4/12/01	7/3/97 thru 2/24/00	Pete Barnov, Sweetwater Authority	D. Gibson	✓	Review data submitted. Follow-up with Pete Barnov and/or Troy Murphree at SWA
			Sweetwater Reservoir	909.21			heavy metals, inorganic chems, many other chems	transmittal letter w/ 7/97 - 1/01 monitoring data	4/12/00	7/3/97 thru 2/24/00	Pete Barnov, Sweetwater Authority	D. Gibson	✓	Review data submitted. Follow-up with Pete Barnov and/or Troy Murphree at SWA
				909.2??	river/reservoir??			data files submitted by USGS	4/12/01	9/20/99, 11/29-30/99, 9/5/00, 3/20/01	Patricia Schiffer	K. Cole	✓	review data
			Alvarado Creek	909.11			metals & organics	Toxics Substance Monitoring Program - 1998	in house	Jun-98	D. Rassmussen	L. Pardy	✓	review data
			Sweetwater/ Salt Marsh	909.12			metals & organics	Toxics Substance Monitoring Program - 1998	in house	Jul-98	D. Rassmussen	L. Pardy	✓	review data
				909.12			organics	Toxics Substance Monitoring Program - 2000	in house	Jul-00	D. Rassmussen	L. Pardy	✓	review data
			Sweetwater River	909.12/909.21			eutrophication				Troy Murphree, Sweetwater Authority	M. Porter	✓	Per Porter contact Murphree for info/data
				909.100 thru 909.300	at Hwy 79 near I8		nutrients, TDS, turbidity	"Linda Pardy Sheet 1"		6/2/98	SDRWQCB 1998 sampling		✓	review data. see 3/5/01 email to Tracy Weddle @NPS from L. Pardy. Check with pardy to see if there is more.
				909.100 thru 909.300	upstream of Hwy 94 (Campo Rd)		nutrients, TDS, turbidity	"Linda Pardy Sheet 1"		6/2/98	SDRWQCB 1998 sampling		✓	review data. see 3/5/01 email to Tracy Weddle @NPS from L. Pardy. Check with pardy to see if there is more.
				909.100 thru 909.300	downstream of Willow St		nutrients, TDS, turbidity	"Linda Pardy Sheet 1"		6/2/98	SDRWQCB 1998 sampling		✓	review data. see 3/5/01 email to Tracy Weddle @NPS from L. Pardy. Check with pardy to see if there is more.
				9.100 thru 9.300	5 riffles downstream of Riverside Dr near I-8		BMI	SDRWQCB: 1999 Biological Assessment Annual Report		May, Sep & Nov 98, May 99	James M. Harrington jharring@ospr.dfg.ca.gov		✓	review data
				909.100 thru 909.300	5 riffles upstream of Hwy 94		BMI	SDRWQCB: 1999 Biological Assessment Annual Report		May, Sep & Nov 98, May 99	James M. Harrington jharring@ospr.dfg.ca.gov		✓	review data
				909.100 thru 909.300	5 riffles downstream of Sweetwater Rd		BMI	SDRWQCB: 1999 Biological Assessment Annual Report		May, Sep & Nov 98, May 99	James M. Harrington jharring@ospr.dfg.ca.gov		✓	review data
				909.12			metals & organics	Toxics Substance Monitoring Program - 1997	in house	Jun-97	D. Rassmussen	L. Pardy	✓	

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KERI	10	Otay												
			Otay Creek	901.20				Letter from Bay Keepers	5/15/01		Bruce Reznik		✓	review data
			Otay River	910.20			metals & organics	Toxics Substance Monitoring Program - 1997	In house	Jun-97	D. Rassmussen	L. Pardy	✓	
			Lower Otay Reservoir	910.31	reservoir		bacteria?	data files submitted by City of San Diego	5/15/01		Jeff Pasek/Ron Coss, City of SD	D. Gibson	✓	review data

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	No.	Name		Hydrogeologic Unit No.	Narrative Description	Length/Area		Document Title	Date Rec'd	Dates of Sampling	Contact	RWQCB Contact		
LISA	11	Tijuana												
			Morena Reservoir	911.50	reservoir		bacteria?	data files submitted by City of San Diego	5/15/01		Jeff Pasek/Ron Coss, City of SD	D. Gibson	✓	review data
			Barret Lake	911.30	reservoir		Pesticides, organics, MTBE, TDS, Metals	data files submitted by City of San Diego	5/15/01		Jeff Pasek/Ron Coss, City of SD	D. Gibson	✓	review data
			Cottonwood Creek	911.20	2nd Street storm drain pipe outfall, Moonlight Beach		diazinon	City of Encinitas Municipal Stormwater Permit Compliance Report (90-42)		2/1/00	Kerry Miller, City Manager	L. Pardy	✓	review data & discuss w/ Lindy Pardy first and then City of Encinitas for more info
				911.20	also includes Troy Creek		Temp, TDS, DO, pH, ORP, Flow Rate, Metals, Ben. Com Analysis	data files submitted by City of San Diego	5/15/01	Jan 96 - Jan 01	Jeff Pasek/Ron Coss, City of SD	D. Gibson	✓	review data
			Long Canyon Creek	911.60				data files submitted by City of San Diego	5/15/01	Jan 96 - Jan 01	Jeff Pasek/Ron Coss, City of SD	D. Gibson	✓	review data
			Pine Valley Creek	911.30				data files submitted by City of San Diego	5/15/01	Jan 96 - Jan 01	Jeff Pasek/Ron Coss, City of SD	D. Gibson	✓	review data
			Pine Creek	911.30	5 locations		Coliforms, Nutrients, TDS, Turbidity	USDA Forest Service Sampling	6/27/01	Jan - Sep, 1998	Ron Wright, USDA Forest Service	Jimmy / Keri	Yes	review data
			La Posta Creek	911.60				data files submitted by City of San Diego	5/15/01	Jan 96 - Jan 01	Jeff Pasek/Ron Coss, City of SD	D. Gibson	✓	review data
			Kitchen Creek	911.60			Temp, TDS, DO, pH, ORP, Flow Rate, Metals, Ben. Com Analysis	data files submitted by City of San Diego	5/15/01	Jan 96 - Jan 01	Jeff Pasek/Ron Coss, City of SD	D. Gibson	✓	review data
			Noble Canyon Creek	911.41				data files submitted by City of San Diego	5/15/01	Jan 96 - Jan 01	Jeff Pasek/Ron Coss, City of SD	D. Gibson	✓	review data
			Tijuana River	911.00			Nutrients, Metals, Organics, Pesticides, Sedimentation	data files submitted by USGS	4/12/01	1/26/01, 2/13/01, 2/23/01	Patricia Schiffer	K. Cole	✓	review data
				911.11			metals & organics	Toxics Substance Monitoring Program - 1997	in house	Jun-97	D. Rassmussen	L. Pardy	✓	
			Tijuana Estuary	911.11								K. Dorsey		Check w/ K. Dorsey re: neighbor info.

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	No.	Name		Hydrogeologic Unit No.	Narrative Description	Length/Area		Document Title	Date Rec'd	Dates of Sampling	Contact	RWQCB Contact		
JOAN		Other	Coastline		coastline		bacteria, tox tests, sed chems	Bight 98			Ken Schiff, SCCWRP Steve Bay, SCCWRP Chuck Katz, SPAWAR	P. Michael		Review data available. Follow-up with Steve re: recommendations.
			Numerous beaches through out county		coastline		bacteria	SD County Beach Closure Report 1997, 98, 99 and 00	5/15/01		Clay Clifton (619) 338-2386	M. Porter/ K.Cole	✓	review data
			Coastline		coastline			Surfrider Report				B.Posthumous		No info of substance/use.
JIMMY/KERI			creeks		creeks			wet weather monitoring	1999-2000		Copermittees	P. Hammer	✓	