7.1. Regulatory Background

Relevant Legal Memos

The following legal memos in Appendix B are relevant to TMDL implementation plans:

- *Do TMDLs Have to Include Implementation Plans?*
- *Legal Authority for Offsets, Pollutant Trading, and Market Programs to Supplement Water Quality Regulation in California's Impaired Waters*
- *Guidance Regarding the Extent to Which Effluent Limitations Set Forth in NPDES Permits Can Be Relaxed in Conjunction With a TMDL*

Regardless of the technical track each project follows, the early planning of implementation options is essential. The early implementation planning will support the development of the implementation plan through the identification of existing regulatory controls and citations of the relevant sections of the California Water Code, which establishes the RWQCB's authority to enforce the regulatory actions.

State authorities are set out under the Porter-Cologne Water Quality Control Act, which is Division 7: Water Quality (Sections 13000–14958) of the California Water Code (http://www.waterboards.ca.gov/water_laws/docs/portercologne2003.pdf). Water Code Section 13242 provides for establishing an implementation program for achieving WQOs in water quality control plans (Basin Plans). The program of implementation must describe the nature of actions that are necessary to meet the objectives, including recommendations for action by both private and public entities. The program must also include a time schedule and describe proposed surveillance activities to assess compliance with objectives. Water Code Section 13263 provides authority to regulate discharges of waste through waste discharge requirements (WDRs). WDRs may be used to implement relevant water quality control plans. The term "discharge of waste" in Porter-Cologne covers nonpoint as well as point sources of pollution. "Discharges of waste" are not limited to waste disposal, but also include releases of pollutants as part of other activities. Hydrological or hydrogeological modifications, for example, that cause the release of wastes into state waters may be regulated under WDRs. Although an RWQCB may not "specify the design, location or type of construction" of the means of compliance, it can specify a particular management practice to define a level of compliance so long as the RWQCB allows the discharger to achieve compliance in any lawful manner.

The SWRCB has adopted a Policy for Implementation and Enforcement of the Nonpoint Source Pollution Control Program (NPS Implementation and Enforcement Policy) (May 2004) as required by Water Code Section 13369. This policy provides a description of the framework for implementing and enforcing the State's nonpoint source pollution control program. Under the policy, nonpoint source dischargers are required to develop pollution control programs that include four key elements. These include: (1) dischargers must show they are knowledgeable about the water quality requirements they are required to meet and that the management practices (MPs) they propose to implement are designed to meet those water quality requirements; (2) the MPs to be implemented must be identified and the process for verifying their implementation described; (3) implementation time schedules with interim milestones must be established: this includes a time schedule for MP implementation and a time schedule for meeting water quality objectives; and (4) feedback mechanisms must be designed to track and evaluate progress. Implementation programs may be developed by individual dischargers or by groups of dischargers as participants in third-party coalition arrangements or a third-party local, state or federal program. Third-parties are defined as any entity that is not under the permitting or enforcement jurisdiction of the SWRCB or a RWQCB.

If a TMDL or other regulatory action is being adopted without sufficient information to develop a complete implementation plan, the implementation plan can be developed consistent with an adaptive approach that outlines the various stages of implementation that are expected and the process for fully realizing the regulatory actions. The implementation plan may adopt initial stages, such as a study program, or may contain a commitment by the RWQCB to reconsider the implementation plan by a

specified time. In such cases, the Office of Administrative Law has held that the RWQCB must **require** itself (by use of the term *shall* in the adopting Resolution) to produce a full implementation plan, not just **intend** to do so (by use of the term *will*) (*Administrative Procedures Manual*, Chapter 8, Water Quality).

7.2. Components of Implementation Plans

Implementation plans may include both regulatory and nonregulatory actions. For regulatory actions, implementation plans should clearly describe what is required and who the responsible parties are. The plan can include recognition of actions that are already occurring; actions that may occur in the short term and long term; techniques that still must be designed, tested, and evaluated prior to "full" implementation; corrective or preventive actions; and monitoring/testing actions to resolve key uncertainties or verify assumptions. The plan also recognizes the direct or indirect responsibilities of the various responsible or cooperating agencies including federal, state, and local agencies, special districts, nongovernmental organizations, landowners, and dischargers. Although determination of the exact means of compliance is the role of the responsible agency, the plan must still provide a discussion of the anticipated and/or possible means of compliance. For regulatory actions requiring Basin Plan amendments, the scientific basis of the implementation plan is subject to peer review as well. In many cases multiple responsible jurisdictions and responsible agencies will be tasked with carrying out the implementation efforts.

An implementation plan in California should include the following items:

- Description of the actions necessary to achieve water quality standards. For TMDLs, they are actions to achieve waste load and load allocations and numeric targets
- Action to resolve key uncertainties and verify key assumptions
- A schedule and key milestones for the actions to be taken
- Monitoring and surveillance to be undertaken to determine compliance with the water quality standards. For TMDLs, this includes tracking and evaluating actions and attainment of waste load and load allocations and numeric targets

Implementation planning should begin in the earliest stages of project planning and incorporate stakeholder involvement and recognition of the various sources likely to be affected by the management actions. In cases involving nonpoint source management, the general components of the implementation plan should be consistent with Nonpoint Source Program Implementation Policy (SWRCB, 2004).

Project analyses are performed with the goal of evaluating and selecting solutions that can be implemented. Selection of management alternatives and TMDL allocations also incorporates knowledge of how implementation can be achieved and what cost-effective options are available. Although stakeholders often have latitude in selecting how a loading goal will be achieved, identifying feasible and successful actions is essential to building effective plans. Steps in designing an implementation plan include

- **Identify current activities.** Often actions have already been initiated to begin to address water quality impairments. Practitioners should check the Basin Plan for existing or ongoing regulatory actions. Implementation plans should be designed to be consistent with existing policies and procedures. Future actions may need to build on these efforts to avoid duplication. For example, existing NPDES permit requirements for directly affected discharges and similar ones should be reviewed; the status of implementation of nonpoint source management measures and practices for applicable categories or specific sources should also be reviewed.

- **Identify common interests and overlapping objectives.** Implementation of regulatory actions may benefit and support other related restoration projects or help to prevent future degradation of related water quality parameters. Potential related activities may be associated with projects that address endangered species, flood protection, water supply, watershed management, and land use planning.

- **Engage stakeholders.** Early in the process stakeholders can be involved in the consideration of solutions and alternatives. Stakeholders can guide the selection of management activities, provide valuable perspective on past activities, and build support for volunteer initiatives. Engaging stakeholders early helps to identify collaboration opportunities and optimize the trade-offs between certainty of actions and flexibility. Related guidance is provided in the stakeholder issue paper in Appendix F.

- **Identify opportunities for management practices.** The most viable opportunities need to be identified based on considerations of source type, impairment type, and size of load reduction required. Opportunity evaluation can consider the suitability of local conditions for management measures (e.g., soil type appropriate for infiltration trenches), the availability of technology (e.g., advanced wastewater treatment sufficient to meet a nutrient target), or the accessibility or availability of land (e.g., sites for stormwater facilities or riparian corridors).

- **Consider alternatives and cost.** The implementation plan can include consideration of multiple alternatives to achieve the water quality standards. Alternatives can be described and evaluated based on their effectiveness in meeting water quality standards and associated loading targets, and the cost associated with implementation. Implementing agencies have latitude to develop more specific plans that select an alternative, incorporate features from multiple alternatives, or define additional management techniques. Implementation planning may also incorporate pollutant trading or other innovative funding mechanisms.

Typical Source Categories

NPDES Wastewater. Wastewater discharges under NPDES discharge permits, subject to regulation under the state's Porter-Cologne Water Quality Control Act (Division 7 of the Water Code) and the federal CWA.

NPDES Stormwater. The CWA requires various industrial facilities, construction sites, and urban areas with more than 10,000 people to control the amount of pollutants entering their storm drain systems. (http://www.swrcb.ca.gov/stormwtr/index.html)

Nonpoint Sources. Nonpoint sources contribute diffuse loadings in major categories defined by the coastal zone management program, including urban, agriculture, forestry, marina, hydromodification, and wetlands. (California's nonpoint source Web site at http://www.swrcb.ca.gov/nps/index.html, and the USEPA's Web site at http://www.epa.gov/OWOW/NPS/MMGI/)
Typical nonpoint sources in California are:

- Agriculture-Orchards
- Agriculture-Row crops
- Agriculture-Grazing
- Agriculture-Confined animals
- Forestry-Timber harvest
- Forestry-Recreational use
- Urban
- Urban-Rural residential
- Marinas
- Hydromodification
- Wetlands
- SLIC/DOD/Superfund

Bay Protection and Toxic Clean-up Program (BPTCP). The BPTCP is a comprehensive effort by the SWRCB and RWQCBs to programmatically link environmental monitoring and remediation planning. (http://www.swrcb.ca.gov/bptcp/)

Land Application of Waste. The biosolids program addresses land application of solid waste to agricultural, silvicultural, horitcultural, and land reclamation activities. (http://www.swrcb.ca.gov/programs/biosolids/index.html)

Mines. California Department of Conservation provides oversight for mining and mine reclamanation activities. The Office of Mine Reclamation (OMR) was created in 1991 to administer the Surface Mining and Reclamation Act of 1975 (SMARA). Established to meet the act's requirements, OMR provides assistance to cities, counties, state agencies, and mine operators for reclamation planning and promotes cost-effective reclamation. (http://www.consrv.ca.gov/OMR/)

However, the specific plans must be designed to meet regulatory actions as incorporated in the Basin Plan amendment.

7.3. Technical Considerations in Implementation Planning

Designing an effective implementation plan requires consideration of the impairment type, sources and load delivery mechanisms, and the linkage of the management needs to the sources. Major source types considered in impaired water analyses and implementation plans are wastewater discharges (i.e., municipal, industrial), stormwater discharges, nonpoint sources, toxic hot spots, land application of waste, and various other discrete sources. These major source categories are described in the sidebar on p. 7-4.

Nonpoint source guidance is being developed, in conjunction with development of the California Impaired Waters Guidance, to support the technical aspects of nonpoint source implementation, as well as the development of TMDL implementation plans and watershed plans. The goal of the Nonpoint Source Guidance is to provide a central resource for technical information regarding nonpoint source management practices in the state of California. The information will assist state agencies, regional boards, local agencies, and nonpoint source practitioners in the identification and implementation of practices to protect high-quality waters and restore impaired waters. The Nonpoint Source Guidance is organized by the six nonpoint source categories (agriculture, forestry, urban areas, marinas and recreational boating, hydromodification, and wetlands/riparian areas/vegetated treatment systems) that are identified in the Plan for California's Nonpoint Source Pollution Control Program (January 2000).

In all cases, management techniques are selected based on how appropriate they are to the individual source type. Some factors to consider in the selection of management practices are

Additional Information on Management Techniques

Documents:

Metcalf and Eddy. 1991. *Wastewater Engineering: Treatment, Disposal, Reuse*. 3rd ed. McGraw-Hill, Inc., New York.

USEPA. 1993. *Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters*. EPA-840-B-93-001c. U.S. Environmental Protection Agency, Office of Water, Washington, DC.

USEPA. 1997b. *Techniques for Tracking, Evaluating, and Reporting the Implementation of Nonpoint Source Control Measures — Agriculture*. EPA 841-B-97-010. U.S. Environmental Protection Agency, Office of Water, Washington, DC.

USEPA. 1997c. *Techniques for Tracking, Evaluating, and Reporting the Implementation of Nonpoint Source Control Measures — Forestry*. EPA 841-B-97-009. U.S. Environmental Protection Agency, Office of Water, Washington, DC.

USEPA. 2001. *Techniques for Tracking, Evaluating, and Reporting the Implementation of Nonpoint Source Control Measures -- Urban*. EPA 841-B-00-007. U.S. Environmental Protection Agency, Office of Water, Washington, DC.

California Stormwater Quality Association (CASQA). 2003. *California Stormwater Best Management Practices Handbooks:*
Municipal
New Development and Redevelopment
Construction
Industrial and Commercial
(http://www.cabmphandbooks.com/)

Databases:

The SWRCB's Web-enabled Nonpoint Source Database completed November 2003) providing a reference guide to available management practices, the effectiveness of techniques to remove pollutants, and the range of expected installation and maintenance costs. (http://www.swrcb.ca.gov/nps/index.html)

USEPA and American Society of Civil Engineers (ASCE) database of performance data on best management practices (BMPs) for more than190 BMP studies conducted over the past 15 years. (http://www.bmpdatabase.org/ [through http://www.epa.gov/ost/stormwater/])

- Availability of appropriate techniques, management measures, and individual practices for the impairment and source categories.
- Type of analyses needed to evaluate the ability of proposed management techniques to meet the objectives (WQOs, allowable loadings, or other measures) identified by the regulatory actions.
- The locations of the impairment(s) and the need to target management by location and source type.
- Acceptance by responsible parties.
- Overlapping benefits for multiple pollutants or stressors.
- Incremental initiation of management activities based on supporting experiments or investigation of management techniques in an adaptive process.

For information on available techniques, estimates of effectiveness, and considerations in the design and siting of management practices, refer to the references and Internet sites listed in the sidebar on p. 7-5.

Information on the nonpoint source program is available on the Waterboards web site at http://www.waterboards.ca.gov/nps information available at the site includes:

- **California Nonpoint Source Encyclopedia.** A condensed quick reference guide that provides an entry point to information, including an overview of nonpoint source management; discussion of each of the six source categories and associated management measures, practices, and applicability to California regions; description of techniques used to analyze management practice effectiveness, source loading, and management costs; and key contact information, references, and resources.
- **Nonpoint Source Database.** An online system that provides a quick reference guide to available management practice technologies, the effectiveness of techniques to remove pollutants, and the range of expected installation and maintenance costs.

In addition the adopteded The Policy for Implementation and Enforcement of the Nonpoint Source Pollution Control Program is available on the SWRCB's Web site at http://www.waterboards.ca.gov/nps/docs/oalfinalcopy052604.doc .

7.4. Estimating Management Effectiveness

Based on the results of project analyses and an understanding of the source loading characteristics, various estimates of management effectiveness can be performed. These analyses can be used to link the proposed management actions with the desired load reductions, and determine whether the proposed management actions will be sufficient to meet WQOs (e.g., through TMDL allocations). Table 7-1 provides a sample worksheet for a TMDL study in which a load reduction of 150 pounds is required. This is a generalized illustration and is not intended to represent any particular location or pollutant. This illustration shows three sources contributing loads to the impaired waterbody. For two of the sources, a portion of the load is expected to be managed. A percent effectiveness is selected for each managed area based on the type of source, management technique employed, and the type of pollutant managed. In this example, one source area (A3) is assumed to have no additional management. Typically this would occur

if the source loading was associated with natural conditions (e.g., wildlife, undisturbed forest) or was already fully managed and no further reductions were expected.

Table 7-1. Sample Worksheet for Estimating Management Needs to Meet Loading Target

Project #/Name:				
Date:				
Total Estimated Load (lb) to be managed				1,000
Practice	Load Treated	Percent Effectiveness	Load Reduction (lb)	
Source Category A1 - Total Load = 200 lb				
Managed area 1	100	50%	(50)	
Managed area 2	50	65%	(33)	
No additional management	50	0%	0	
				(83)
Source Category A2 - Total Load = 300 lb				
Managed area 3	100	50%	(50)	
Managed area 4	50	35%	(18)	
No additional management	150	0%	0	
				(68)
Source Category A3 - Total Load = 500 lb				
No additional management	500	0%	0	
				0
Implementation Estimate				850
Targeted Load	150 lb load reduction required			850

7.5. Consideration of Cost in Implementation Plans

Economics is always a consideration in the evaluation and formulation of management alternatives. Stakeholders may offer insights and concerns regarding the cost of management options. Ongoing dialogue with stakeholders is beneficial and can result in incorporating cost factors in the selection and evaluation of management alternatives. Consideration of economics can also help to identify opportunities for collaboration or leveraging in conjunction with existing projects.

The RWQCBs, in general, adopt TMDLs or other management actions as Basin Plan amendments. Under state law, there are three specific triggers for RWQCB consideration of economics or costs in basin planning:

- The RWQCBs must estimate costs and identify potential financing sources in the Basin Plan before

Relevant Legal Memos

The following legal memos in Appendix B are relevant to consideration of costs in the impaired waters process:

- *Economic Considerations in TMDL Development and Basin Planning*
- *Guidance on Consideration of Economics in the Adoption of Water Quality Objectives*

implementing any agricultural water quality control program.

- The RWQCBs must consider economics in establishing WQOs that ensure the reasonable protection of beneficial uses.
- The RWQCBs must comply with the California Environmental Quality Control Act (CEQA, http://ceres.ca.gov/topic/env_law/ceqa/) when they amend their Basin Plans. CEQA requires that the RWQCBs analyze the reasonably foreseeable methods of compliance with proposed performance standards and treatment requirements. This analysis must include economic factors.

Economic factors come into play under federal law when the RWQCBs designate uses. Specifically, the RWQCBs can decide not to designate, to dedesignate, or to establish a subcategory of a potential use where achieving the use would cause substantial and widespread economic and social impact.

As part of implementation planning, the RWQCBs may include analysis of the cost of the potential management techniques identified in one or more alternatives. The cost can be approximated based on available information on potential management techniques to be applied, examination of the locations or sites where management could be initiated, typical literature or local experiences with specific practices, and estimates provided by interested stakeholders. The SWRCB's Web-enabled Nonpoint Source Database (to be completed November 2003) will also provide a reference guide to cost associated with available management practices, including the range of expected installation and maintenance costs (http://www.waterboards.ca.gov/nps/index.html).

Sample Cost Estimate for Implementation Planning for the Alamo River Sedimentation/Siltation TMDL

For the Alamo River sedimentation/siltation TMDL, the estimated total cost of implementing MPs ranges from $5.00 to $52.50 per acre per year, which is generally estimated to be less than 2 percent of production costs. The development of Farm Water Quality Management Plans is estimated to be less than $200.00 per field. Monitoring costs are estimated to range from $100.00 to $500.00 depending on the monitoring program. The preparation of the IID monitoring plan is estimated to be $25,000. Implementation of the IID monitoring plan is estimated to be $70,000 per year, and the cost of characterizing dredging impacts is estimated to be $20,000.

Potential sources of financing are private financing by individual sources; bond indebtedness or loans from government institutions; surcharge on water deliveries to lands contributing to the sediment pollution problem; taxes and fees levied by the Irrigation District that provides drainage management; state and/or federal grants and low-interest loans, including State Proposition 13 (Costa-Machado Act of 2000) grant funds and Federal Clean Water Act Section 319(h) grant funds; and single-purpose appropriations from federal and/or state legislative bodies.

Source: Colorado River Basin Regional Water Quality Control Board, 2002. Basin Plan Amendment for the Alamo River Sedimentation/Siltation TMDL. Page 16 of 20.

The SWRCB's Economics Unit provides support for the analysis of economic implications of management. In an implementation plan, funding sources should be identified to the extent possible, as options, grants, utilities, or other mechanisms. An example of implementation planning text for a TMDL is shown in the sidebar.

7.6. Monitoring and Surveillance Plans

Essential to the implementation plan are the methods that will be used to monitor and track progress. Monitoring and tracking are needed for the following purposes:

- Evaluate progress toward meeting water quality standards
- Check attainment of numeric targets and TMDL allocations
- Verify or refine assumptions, resolve uncertainties, and improve scientific understanding

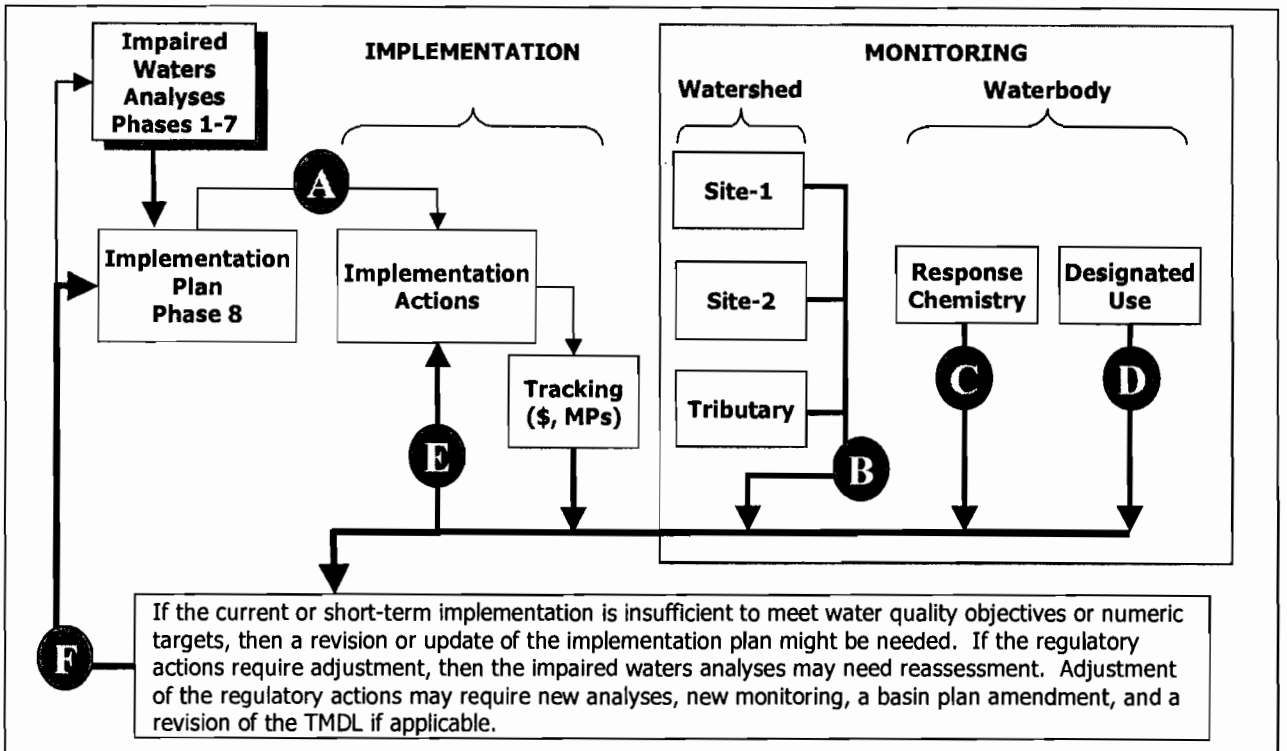
- Track and evaluate short- and long-term implementation actions
- Identify resource or implementation shortfalls
- Check compliance with specific requirements
- Identify potential needs for revision or update of regulatory actions

Designing a monitoring and surveillance program requires addressing technical, economic, and logistical challenges. The monitoring of progress may require examination of multiple measures of water quality, including chemical, physical, and biological measurements. Hydrologic variability (daily, seasonal, and annual) can make water quality response to management difficult to discern. Monitoring may need to be targeted to specific critical time periods associated with the protection of the beneficial use (e.g., aquatic life). The size of the watershed and location of impairment will need to be considered in determining where and how often sampling can occur. For many watersheds, especially larger ones, the lag time between the initiation of an action and a downstream receiving water response may necessitate long-term monitoring and tracking. Sediment studies often show that even with the aggressive adoption of management practices, it may take more than 25 years before water quality standards are fully achieved. In other cases, management practices may take a long time to become fully effective. For example, for temperature impairments related to insufficient shading, restoration time frames are on the order of 20 years or more since forested riparian zones need time to establish.

The use of multiple monitoring and tracking techniques can also help to evaluate progress on a continuous basis, from the procurement of funding resources, to the initiation of management techniques, until beneficial use support is achieved. The following are some of the monitoring and tracking techniques that can be used:

- Funding (dollars committed or expended)
- Actions (e.g., MPs installed, load reduction per MP)
- Local response (e.g., edge of field/MP effectiveness)
- Measurements of pollutant concentrations or loads in tributaries
- Receiving water chemistry (e.g., comparison to WQOs or targets)
- Aquatic life indicator (presence or diversity of fish population)

Multiple levels of tracking can help to diagnose problems and guide actions in an adaptive management approach. Considerations in the selection of the appropriate monitoring and tracking techniques include the impairment type, size, location, sources, and management techniques; funding availability for management; time constraints or requirements; and monitoring resources. Monitoring and evaluation can be built into the implementation plan to evaluate management techniques before initiating long-term actions. This continuous process of evaluation and improvement supports the adaptive implementation process. If management actions are deemed insufficient or more information is available indicating the need for reassessment, then the adaptive process allows for initiating a new impaired waters analysis (i.e., phases 1–7). Figure 7-2 illustrates the adaptive management approach and describes the relationships between various levels of tracking, the multiple opportunities for evaluation of progress, and the potential for adjustment.



A. Regulatory actions are identified and implemented through appropriate local, state, and federal authorities. Management activities can include nonpoint source management measures, permits, stormwater management, compliance, and abatement activities. Financial or stakeholder resources are required to put management plans in place. Typically, procurement of these resources must be in place before the management activities can proceed.

B. Response can be most easily measured closest to the management action. Selected monitoring locations can be used to directly evaluate the **localized** benefit of various management practices.

C. Chemical/biological response to management can be measured in the impaired waterbody to evaluate improvement or trends relative to WQOs. As the distance from management activities and size of the watershed increase, the direct immediate benefit of management is harder to discern, and depending on the pollutant, there may be a considerable delay between management actions and measurable receiving water response. For example, phosphorus load reductions in the watershed may not immediately result in improved lake quality based on measures of summer chlorophyll *a*.

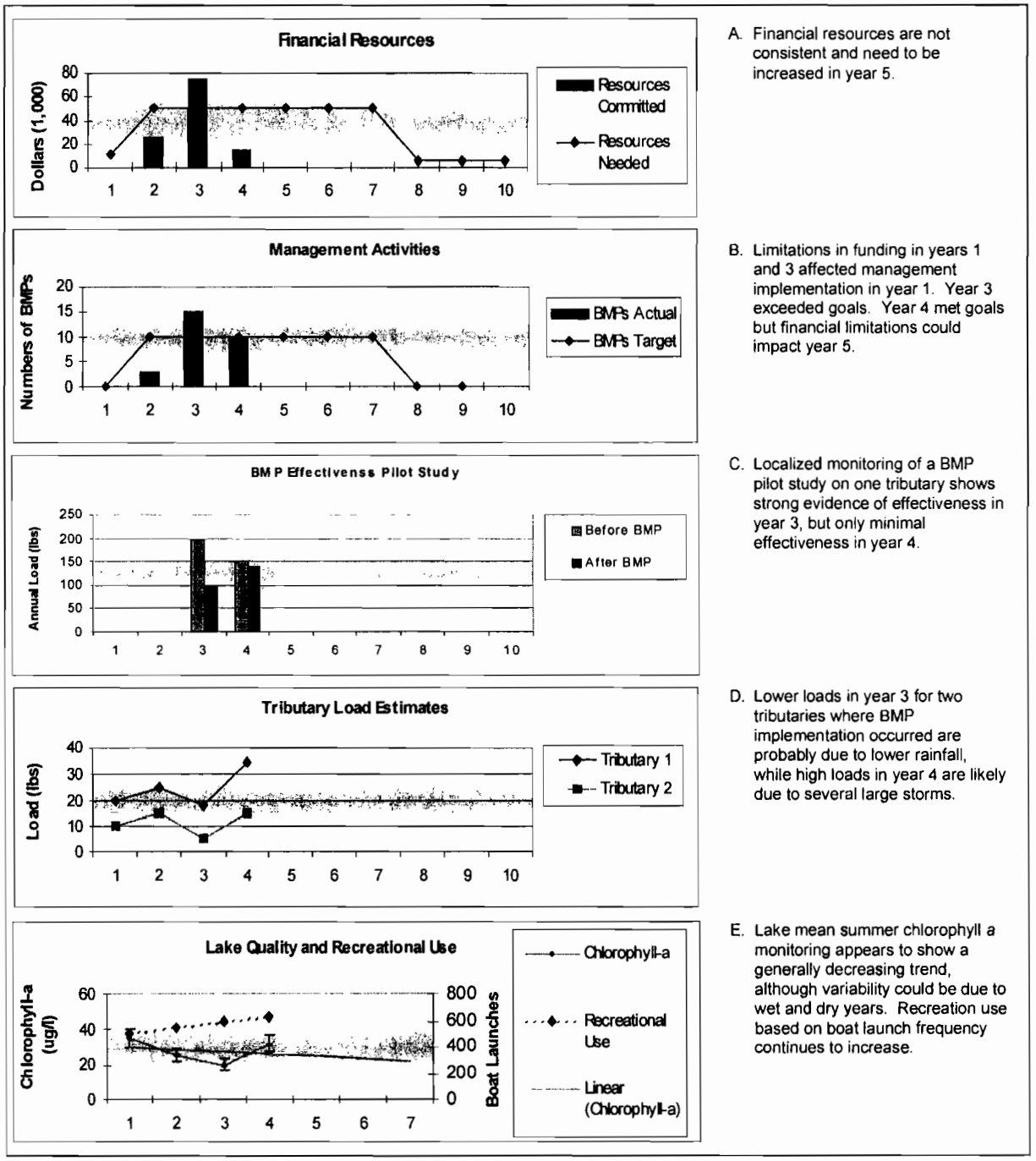
D. Direct measurement of the beneficial use impairment can identify positive trends and desirable responses. For example, if the lake is impaired for aquatic life due to eutrophication, direct measure of fish population and recreational use may identify an improvement in use support.

E. Monitoring at multiple scales (B, C, D) can also lead to a reevaluation of the rate of implementation (are practices being installed?), the type of practices used (some practices might be demonstrated as highly effective), or the need for maintenance of existing management practices (e.g., periodic clean-out of stormwater ponds). In an adaptive approach, initial short-term actions may not fully result in meeting standards. Limited or pilot-scale monitoring can be used to test techniques and support revision or expansion of implementation techniques as appropriate. This reevaluation may indicate that a readjustment of the implementation plan is necessary within the context of the identified regulatory actions.

F. If current actions are insufficient, the implementation plan could be revised or updated based on information gathered during monitoring and tracking (A-E). If adjustment of the implementation plan is insufficient, a reassessment of the regulatory actions and potentially the associated project analyses is indicated. This update could result in new data collection, project analyses, revised regulatory actions, additional basin plan amendments, or re-submittal of the TMDL, if applicable.

Figure 7-2. Monitoring and Adaptive Management Approach

Multiple levels of tracking and monitoring can be employed over time to determine trends and evaluate the trend or trajectory indicating movement toward the water quality management goals. Figure 7-3 provides an illustration of how multiple types and levels of tracking can be used to support an adaptive management approach to implementation. This figure shows five monitoring and surveillance measures for a nutrient TMDL for a lake with aquatic life and recreational beneficial use impairments, with a timeline as years from the project start (on the x-axis). Review of implementation progress at the end of year 4 of the example is described for each of the graphical displays (A through E).



A. Financial resources are not consistent and need to be increased in year 5.

B. Limitations in funding in years 1 and 3 affected management implementation in year 1. Year 3 exceeded goals. Year 4 met goals but financial limitations could impact year 5.

C. Localized monitoring of a BMP pilot study on one tributary shows strong evidence of effectiveness in year 3, but only minimal effectiveness in year 4.

D. Lower loads in year 3 for two tributaries where BMP implementation occurred are probably due to lower rainfall, while high loads in year 4 are likely due to several large storms.

E. Lake mean summer chlorophyll *a* monitoring appears to show a generally decreasing trend, although variability could be due to wet and dry years. Recreation use based on boat launch frequency continues to increase.

Figure 7-3. Example of Multiple Tracking Techniques

Based on review of Figure 7-3 for this example, the manager might conclude that the focus should continue on the procurement of funding and the installation of MPs to meet or exceed identified goals. Continued monitoring of the tributary loading and lake conditions is needed to evaluate trends and determine whether progress is being made. As is often the case in environmental systems, a longer time period is needed to determine whether water quality conditions are improving. However, the multiple levels of tracking provide an indicator of potential success and a need for strong financial support of the implementation.

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9. GLOSSARY

Beneficial Uses. Uses of water that may be protected against degradation, including domestic, municipal, agricultural, and industrial supply; power generation; recreation; aesthetic enjoyment; navigation; and preservation and enhancement of fish, wildlife, and other aquatic resources and preserves. (California Water Code Section 13050(f))

Bioassessment. Biological assessment is the use of biological community information along with the measure of the physical and habitat quality to determine the integrity of a waterbody.

California Toxics Rule (CTR). Numerical water quality criteria established by USEPA for priority toxic pollutants for California's inland surface waters, enclosed bays, and estuaries.

Conceptual Model. A "conceptual model" of an environmental system is developed using readily available information. The conceptual model is used to visualize all potential or suspected sources of impairment, types and concentrations of pollutants in the impaired water, potential sources and pathways, and interactions between pollutants and related stressors. The use of conceptual models can aid in the identification of the most likely pollutant(s) or stressor(s) and support selection of appropriate analysis techniques.

Delist. To remove a water body from the state's 303(d) list through a formal action and approval by USEPA. The process typically involves submitting the state list to USEPA.

Loading Capacity (LC). The greatest amount of loading that a water can receive without violating water quality standards. The LC equals the total maximum daily load.

Load Allocation (LA). The portion of a receiving water's loading capacity that is attributed either to one of its existing or future nonpoint sources of pollution or to natural background sources.

Best Management Practices (BMPs). (Cf. Management Practices, below.) This term has different meanings depending upon whether the discussion relates to Point or Nonpoint Source controls.

1. **(Relating to Point Source Controls)** BMPs include schedules of activities, prohibitions of practices, maintenance procedures, **and other management practices** to prevent or reduce the pollution of 'waters of the United States.' BMPs also include treatment requirements operating procedures (See 40 CFR 122.2.). The term in this context is broad and refers to the entire suite of management practices that may be employed.
2. **(Relating to Nonpoint Source Controls)** Methods, measures or practices **selected by an agency** to meet its nonpoint source control needs. BMPs include but are not limited to structural and nonstructural controls and operation and maintenance procedures. BMPs can be applied before, during and after pollution producing activities to reduce or eliminate the introduction of pollutants into receiving waters. (See 40 CFR 130.2(m).) Relatively few BMPs have been "selected" by the SWRCB, and so for Nonpoint Source controls, the broader term "management measures" should be used in most instances. In California, only one nonpoint source BMP has been certified. It relates to timber operations on federal and non-federal lands.

Management Practices (MPs). This term is roughly equivalent to the federal term BMPs as defined by the federal regulations for point sources (40 CFR 122.2). .

Margin of Safety (MOS). A required component of the total maximum daily load that accounts for the uncertainty about the relationship between effluent limitations and water quality and the quality of the receiving waterbody (Clean Water Act Section 303(d)(1)(C)).

Nonpoint Source (NPS). Pollution sources that are diffuse and do not have a single point of origin or are not introduced into a receiving stream from a specific outlet. Nonpoint source pollutants are generally carried off the land by uncontrolled stormwater runoff. The commonly used categories of nonpoint sources are agricultural return flow, forestry, urban runoff, mining, construction, land disposal, and saltwater intrusion. The term also includes certain sources that may have a single point of origin but are excluded from the definition of "point source" by the Clean Water Act (such as agricultural return flow).

Point Source. Any discernible, confined, and discrete conveyance, including any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, landfill leachate collection system, vessel or other floating craft from which pollutants are or may be discharged. This term does not include return flows from irrigation agriculture or agricultural stormwater runoff. (40 CFR 122.2)

Pollutants. The term *pollutant* is defined in Section 502(6) of the Clean Water Act as "dredged spoil, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt and industrial, municipal, and agricultural waste discharged into water."

Pollution. The term *pollution* is defined in Section 502(19) of the Clean Water Act as the "man-made or man-induced alteration of the chemical, physical, biological, and radiological integrity of water." The term pollution thus includes impairments caused by discharges of pollutants. *Pollution* is also defined in Section 13050(l) of the California Water Code as an alteration of the quality of the waters of the state by waste to a degree that unreasonably affects either the waters for beneficial uses or the facilities that serve these beneficial uses.

Reference Condition. The characteristics of waterbody segments least impaired by human activities. Reference conditions can be used to describe attainable biological or habitat conditions for waterbody segments with common watershed/catchment characteristics within defined geographical regions.

Site-Specific Objectives (SSO). Objectives that reflect site-specific conditions and are appropriate when it is determined that promulgated water quality standards or objectives are not protective of beneficial uses or when site-specific conditions warrant more or less stringent effluent limits than those based on promulgated water quality standards or objectives, without compromising the beneficial uses of the receiving water.

Total Maximum Daily Load (TMDL). The sum of the individual waste load allocations for point sources, load allocations for nonpoint sources and natural background, and a margin of safety. TMDLs can be expressed in terms of mass per time, toxicity, or other appropriate measures that relate to a state's water quality standards.

Use Attainability Analysis (UAA). A structured scientific assessment of the factors affecting the attainment of the use, which may include physical, biological, and economic factors as described in Section 303.10(g) of the Clean Water Act (40 CFR 131.3).

Waste Discharge Requirements (WDRs). WDRs are issued under State law pursuant to California Water Code Section 13263 and apply to dischargers that discharge waste to land or to water. WDRs implement water quality control plans and take into consideration beneficial uses, water quality objectives, other waste discharges, the need to prevent nuisance, and the provisions of California Water Code Section 13241. The disposal method may be by agricultural or non-agricultural irrigation, ponds, landfills, mono-fills, or leachfields. When WDRs are issued for point source discharges to waters of the United States, the WDRs are issued under CWC section 13370 et seq., and constitute an NPDES permit.

Waste Load Allocation (WLA). The portion of a receiving water's loading capacity that is allocated to one of its existing or future point sources of pollution. WLAs are a type of water quality-based effluent limitation. (40 CFR 130.2(h))

Water Quality Limited Segment. Any segment of a waterbody that does not meet applicable water quality standards or is not expected to meet applicable water quality standards, even after application of certain technology-based effluent limitations.

Water Quality Standard (WQS). Provisions of state and federal law that consist of a designated use or uses for the waters of the United States, water quality criteria for such waters based upon such uses, and an anti-degradation policy. Water quality standards are to protect public health or welfare, enhance the quality of the water, and serve the purpose of the Clean Water Act (40 CFR 131.3). Under California law, designated uses are referred to as beneficial uses. In addition to federally promulgated criteria such as the California Toxics Rule, water quality criteria include California adopted narrative or numerical water quality objectives.

10. ACRONYMS

ASCE	American Society of Civil Engineers
BASINS	Better Assessment Science Integrating Nonpoint and Point Sources
BAT	Best available technology
BPT	Best practicable technology
BPTCP	Bay Protection and Toxic Clean-up Program
CASQA	California Stormwater Quality Association
CEQA	California Environmental Quality Control Act
CFR	Code of Federal Regulations
CWA	Clean Water Act
CWC	California Water Code
DEM	Digital elevation model
DoD	Department of Defense
EFDC	Environmental Fluid Dynamics Code
GIS	Geographic information system
GWLF	Generalized Watershed Loading Functions
HSPF	Hydrologic Simulation Program – FORTRAN
IID	Imperial Irrigation District
LA	Load allocation
LC	Loading capacity
LOE	Level of effort
LSPC	Loading Simulation Program – C++
MOS	Margin of safety
MP	Management practice
MRLC	Multi-resolution Land Characteristics
NGO	Non-governmental Organization
NPDES	National Pollutant Discharge Elimination System
NPS	Nonpoint Source
NRCS	Natural Resources Conservation Service
NWIS	USGS's National Water Information System
OMR	Office of Mine Reclamation
PCB	Polychlorinated biphenyl
PCS	Permit Compliance System
QA	Quality assurance
QAPP	Quality Assurance Project Plan
QC	Quality control
QUAL2E	Enhanced Stream Water Quality Model
RWQCB	Regional Water Quality Control Board
SLIC	Spills, Leaks, Investigations and Clean-up program
SMARA	Surface Mining and Reclamation Act of 1975
SSO	Site-specific objective
STATSGO	State Soil Geographic database
STORET	USEPA's STOrage and RETrieval system
SWAMP	Surface Water Ambient Monitoring Program
SWMM	Storm Water Management Model
SWRCB	State Water Resources Control Board
TDS	Total dissolved solids
TMDL	Total maximum daily load
TSS	Total suspended solids
UAA	Use attainability analysis
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
WASP	Water Quality Analysis and Simulation Program

WDR	Waste discharge requirement	WQS	Water quality standard
WQO	Water quality objective	WLA	Waste load allocation

Noble, Connie

From: Carlstedt, Timothy J.
Sent: Monday, June 22, 2009 2:06 PM
To: Noble, Connie
Subject: FW: Tentative Order No. R8-2009-0030: Technical TMDLs

Attachments: EPA9 TMDL Guidance

EPA9 TMDL Guidance

-----Original Message-----
From: Carlstedt, Timothy J.
Sent: Friday, May 15, 2009 2:04 PM
To: 'Mr. David Rice'
Cc: Geoffrey [COCO] Hunt; Mary Lynn Coffee
Subject: RE: Tentative Order No. R8-2009-0030: Technical TMDLs

David--

In furtherance of our agreement to disagree, I wanted to bring the attached EPA guidance to your attention. For both state and EPA developed TMDLs, the final step is for the state to include the TMDL in the Basin Plan, even when EPA has prepared the TMDL pursuant to litigation, the state is to include the TMDL in the Basin Plan. See Sections 3.1, 3.2 and 3.4.

On the topic of the LA Board and the EPA-developed San Gabriel River/Coyote Creek TMDL, as far as I can tell, the LA Board has taken no steps to implement the TMDL -- either through Basin Plan amendment or by re-opening the LA County MS4 permit.

Let me know if you would like to discuss.

Tim

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-----Original Message-----
From: Mr. David Rice [mailto:DavidRice@waterboards.ca.gov]
Sent: Friday, May 15, 2009 12:11 PM
To: Carlstedt, Timothy J.
Cc: Geoffrey [COCO] Hunt; Mary Lynn Coffee
Subject: Re: Tentative Order No. R8-2009-0030: Technical TMDLs

Tim,

Thank you for the proposed language.

David

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>>> "Carlstedt, Timothy J." <tim.carlstedt@bingham.com> 5/14/2009 4:04
>>> PM >>>
David--

This is to follow up on our call on May 12, 2009. As you recall, participants on the call included staff and counsel (yourself) for the Santa Ana Regional Board, EPA Region 9 staff, and representatives and counsel (including myself) for permittees the County of Orange and the City of Irvine. Permittees raised their concern that the current stakeholder process of working with Regional Board staff on development and implementation of TMDLs could be undermined by language in the current draft of the North County MS4 permit. This email summarizes the issue and how Regional Board staff proposed to address our concern.

The Issue

The initial draft of the permit did not implement wasteload allocations (WLAs) from the EPA-developed TMDLs for toxic pollutants, including metals and selenium, and organochlorine compounds (OCs). These TMDLs do not have implementation plans and are referred to as "technical" TMDLs. The initial draft of the permit indicated that, in collaboration with permittees, staff was developing its own TMDLs for metals and selenium that would include implementation plans and that permittees would continue to participate in the development and implementation of these TMDLs. Similarly, the Regional Board has adopted its own TMDLs for OCs, including an implementation plan. Even though this TMDL has not been approved by the State and EPA, the draft permit indicated that permittees have already been taking steps to implement this TMDL.

The current draft of the permit reiterates that staff, in collaboration with permittees, is developing and beginning to implement (even before EPA approval) revised TMDLs (including implementation plans), that will supplant the EPA technical toxics TMDLs. Such collaboration includes participation in and performance under requirements of cooperative stakeholder water quality programs, including those established by the Cooperative Agreement, the Nutrients and Selenium Management Program, and the Toxics Reduction Implementation Program. However, the current draft also provides that until the Regional Board TMDLs are have been approved by EPA, permittees are to comply with the WLAs specified in the EPA technical TMDLs for metals, selenium and OCs. The draft permit provides that compliance with the WLAs is to be though an iterative BMP process.

Agree to Disagree

As an initial matter, permittees reiterated their position that under state law TMDLs are not enforceable until they have been incorporated into the Basin Plan. Further, under state law, TMDLs must include an implementation plan. Accordingly, it is not appropriate to implement the technical TMDLs in an MS4 permit. Attached is additional support for permittees' position; I believe you are familiar with the 1999 memo to Gerard Thibeault from the State Board Office of Chief Counsel (which is included in Appendix B to the attached State of California TMDL guidance).

Because of the resolution reached below, we agreed that we would disagree on this point. Permittees, of course, reserve the right to raise this issue in subsequent proceedings.

The Resolution

When permittees raised the concern to you and staff that a third party might bring an action against permittees for failing to achieve the EPA WLAs (notwithstanding that permittees were working to develop and implement Regional Board WLAs via their performance pursuant to cooperative stakeholder water quality programs), staff replied that, provided permittees continued to participate in the development and implementation of the Regional Board's TMDLs via these programs, the Board would deem them to be in compliance with the permit. In other words, permittees would not have to simultaneously continue to work on

developing and implementing the Regional Board WLAs via stakeholder cooperative programs and at the same time take additional, but undefined, measures to achieve the EPA WLAs, since the measures required under the cooperative stakeholder water quality programs are designed to meet the EPA WLAs, as well as to develop substitute Regional Board TMDLs, including WLAs and implementation plans. You and staff agreed that you would look into clarifying this position with revised permit language and include any such revisions in an errata sheet before the May 22, 2009 Regional Board hearing to adopt the permit. For your convenience, attached is proposed redline language (which also addresses our concern with the Coyote Creek technical TMDL).
Please feel free to call if you have any questions.
Tim
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Guidance for Developing TMDLs in California

EPA Region 9

January 7, 2000

Table of Contents

Disclaimer

This document provides guidance to the State of California concerning its responsibility under section 303(d) of the Clean Water Act concerning the development of TMDLs for water quality-limited segments listed under section 303(d). It also provides guidance to the public and the regulated community on how EPA intends to exercise its discretion in implementing section 303(d) and its regulations regarding TMDLs. The guidance is designed to implement national regulations and policies on these issues. The document does not, however, substitute for section 303(d) of the Clean Water Act or EPA's regulations; nor is it a regulation itself. Thus, it does not impose legally-binding requirements on EPA, the State of California, or the regulated community, and may not apply to a particular situation based upon the circumstances. EPA and State decision makers retain the discretion to adopt approaches on a case-by-case basis that differ from this guidance where appropriate and consistent with the requirements of section 303(d) and EPA's regulations. EPA may change this guidance in the future.

1. What does this guidance address?

Clean Water Act Section 303(d) establishes a water quality assessment and planning process through which states, territories, and authorized tribes are required to identify polluted waterbodies, set priorities for addressing these polluted waters, and write pollutant control plans called Total Maximum Daily Loads (TMDLs) in order to attain state water quality standards, including water quality standards promulgated by EPA for California. This process, known generally as the TMDL process, provides an effective mechanism for determining the causes of waterbody impairment and allocating responsibility among different pollutant discharge sources for reducing pollutant emissions to achieve water quality standards. The TMDL process affords the public the opportunity to participate in decisions about these pollutant control plans. States are generally responsible for developing TMDLs, and EPA reviews and approves TMDLs. If EPA disapproves a TMDL, EPA is responsible for establishing the TMDL for the State. In some cases, EPA may also establish TMDLs when the State has not yet adopted and submitted a required TMDL. TMDLs are implemented through existing regulatory and non-regulatory programs to control pollutant discharges from point sources (e.g. discharges from wastewater treatment plants) and nonpoint sources (e.g. polluted runoff from agricultural lands).

The goal of a Total Maximum Daily Load (TMDL) is to attain state water quality standards including water quality standards promulgated by EPA for California. A TMDL is a written, quantitative assessment of water quality problems and contributing pollutant sources. It identifies one or more numeric targets based on applicable water quality standards, specifies the maximum amount of a pollutant that can be discharged (or the amount of a pollutant that needs to be reduced) to meet water quality standards, allocates pollutant loads among sources in the watershed, and provides a basis for taking actions needed to meet the numeric target(s) and implement water quality standards.

This guidance describes the minimum federal requirements for developing TMDLs as well as additional requirements for establishing TMDLs in California which must be met in order to comply with State legal and administrative procedures.[1] It is important that TMDLs include all the required elements and comply with federal and state procedural requirements in order to ensure that the TMDLs include information needed to implement effective pollutant controls, provide meaningful opportunities for public input, and are legally and technically defensible. More than 500 waterbodies or segments have been identified as needing TMDLs in California, many for multiple pollutants. Therefore, a great deal of work needs to be done by the State, EPA, and interested stakeholders to develop and implement TMDLs. This guidance, which is tailored to California's unique legal and administrative process, should assist in completing this work in a timely manner.

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[1] This guidance reports EPA's understanding of requirements which stem from State statutes, regulations, or policies, based on information furnished by the State Water Resources Control Board (SWRCB) and Regional Water Quality Control Boards (RWQCBs). Interested parties should contact the SWRCB or RWQCBs to obtain definitive guidance concerning State-related requirements.

This guidance is based on existing federal and state requirements in effect in January, 2000. The guidance does not address proposed changes in federal TMDL requirements or possible changes in California's TMDL program being considered in the State legislature. The guidance also does not address the process for identifying waterbodies that do not meet Water Quality Standards after application of technology-based and other required controls (the Section 303(d) list). The guidance does not discuss TMDL implementation requirements in detail since TMDL implementation plans are currently governed by regulatory provisions which are separate from TMDL development requirements. Finally, the guidance focuses upon legal and procedural requirements and does not provide technical guidance concerning scientific methodologies for developing TMDLs.

In August 1999, EPA published proposed revisions to the TMDL regulations and national TMDL guidance. This California guidance will remain in effect unless EPA determines that it is superceded by new regulations and/or guidance.

2. Minimum Required Elements of TMDLs

2.1 Federal Requirements

State TMDL SUBMITTAL and TMDLs established by EPA **must** contain the following elements indicated in bold type in order to be approvable under the Clean Water Act (CWA) and associated federal regulations[2]:

1. Submittal Letter

A letter must be submitted by the State providing notification that the final TMDL(s) for specific water(s)/pollutant(s) were adopted by the State and submitted to EPA for approval under Section 303(d) of the CWA [40 CFR 130.7(d)].

2. Water Quality Standards Attainment

The TMDL and associated waste load and load allocations must be set at levels necessary to result in attainment of all applicable water quality standards, including designated beneficial uses, narrative water quality objectives[3], numeric water quality objectives, and State anti-degradation policies [40 CFR 130.7(c)(1)].

3. Numeric Target(s)

The TMDL document describes applicable water quality standards, including beneficial uses, applicable numeric and/or narrative objectives, and antidegradation

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[2]In this document, the term "must" is used to describe a federal requirement. The terms "may" or "should" are used to describe recommended program actions or elements.

[3] In California, the term "water quality objective" is equivalent to the federal "water quality criteria".

policies. Numeric water quality target(s) for TMDL must be identified, and an adequate basis for target(s) as interpretation of water quality standards must be specifically documented in the submittal. [40 CFR 130.7(c)(1)] TMDLs can be expressed in terms of either mass per time, toxicity, or other appropriate measure.

These targets identify the specific instream (and potentially hillslope) goals or endpoints for the TMDL which equate to attainment of the water quality standard. In some cases, multiple indicators and associated numeric target values may be needed to interpret an individual water quality standard (e.g. multiple fish habitat indicators to interpret acceptable sediment levels). In addition, some TMDLs may incorporate multiple numeric targets to account for seasonal differences in acceptable pollutant levels in a particular water body.

In many cases where applicable standards are expressed in numeric terms, it is appropriate to set the numeric target equal to the numeric water quality standard. However, it may be desirable to interpret a numeric standard in terms other than the method through which the standard is expressed as long as the target(s) can be shown to relate back to achieving the water quality standard(s). For some pollutants (e.g., bioaccumulative toxins or salts) or receiving water settings (e.g. lakes or poorly mixed waters), it makes more sense from the standpoint of source control and impact assessment to focus the TMDL on reductions of pollutant mass loads than solely on avoidance of exceedences of concentration-based standards.

In situations where applicable water quality standards are expressed in narrative terms or where 303(d) listings were prompted primarily by beneficial use or antidegradation concerns, it is necessary to develop a quantitative interpretation of narrative standards. Since a TMDL is an inherently quantitative analysis, it is necessary to determine appropriate quantitative indicators of the water quality problem of concern in order to calculate a TMDL. It is sometimes possible to supplement instream indicators and targets with hillslope targets-- measures of conditions within the watershed which are directly associated with waterbodies meeting their water quality standards for the pollutant(s) of concern.

The numeric targets section generally includes the following elements:

- identification of one or more instream indicators (and possibly hillslope indicators) and the basis for using the indicator(s) to interpret or apply applicable water quality standards
- identification of target levels for each indicator and the technical basis for the targets
- comparison of historical or existing conditions and target conditions for the indicators selected for the TMDL.

If it is determined that water quality standards are now being met throughout the year taking into account seasonal variations and other critical conditions, and are not expected to be exceeded by the next listing cycle, then the TMDL is not required (although it can be developed to support permit issuance or for informational purposes pursuant to Clean Water Act Section 303(d)(3)). If the State determines a TMDL is not necessary after the TMDL development process has begun, the State would normally stop work on the TMDL and identify the waterbody as a candidate for removal from the 303(d) list at the time of the next listing cycle. EPA

encourages the State to notify interested members of the public of this finding and potentially provide an opportunity for public review of the State's analysis. For TMDLs required under consent decrees, the State should notify EPA immediately of any finding that the TMDL is not necessary in order for EPA to ensure that consent decree requirements are met.

4. Source Analysis

Point, nonpoint, and background sources of pollutants of concern must be described, including the magnitude and location of sources. The TMDL document demonstrates all sources have been considered [40 CFR 130.2(i) and 40 CFR 130.7(c)(1)].

An understanding of pollutant loading sources and the amounts and timing of pollutant discharges is vital to the development of effective TMDLs. The TMDL document must provide estimates of the amounts of pollutants entering the receiving water of concern or, in some cases, the amount of pollutant that is bioavailable based on historic loadings stored in the aquatic environment. These pollutant sources or causes of the problem need to be documented based on studies, literature reviews or other sources of information. Because the source analysis provides the key basis for determining the levels of pollutant reductions needed to meet water quality standards, and the allowable assimilative capacity, TMDL, wasteload allocations, and load allocations, quantified source analyses are required. Sources can be categorized in many ways, including but not limited to discharge source, land use category, ownership, pollutant production process (e.g. sedimentation processes), and/or tributary watershed areas. The source analysis must discuss in detail the data and methods used to estimate source contributions.

5. Link Between Numeric Target(s) and Pollutant(s) of Concern

The TMDL document must describe the relationship between numeric target(s) and identified pollutant sources, and estimate total assimilative capacity (loading capacity) of the waterbody for the pollutant of concern [40 CFR 130.7(d) and 40 CFR 130.2 (i) and (f)].

The loading capacity is the critical quantitative link between the applicable water quality standards (as interpreted through numeric targets) and the TMDL. Thus, a maximum allowable pollutant load must be estimated to address the site-specific nature of the impairment. The loading capacity reflects the maximum amount of a pollutant that may be delivered to the waterbody and still achieve water quality standards. A number of different loading capacity approaches have been approved as part of TMDLs.

The loading capacity section must discuss the methods and data used to estimate loading capacity. A range of methods can be used from predictive water quality models to inferred linkages based on comparison of local reference conditions with existing conditions in the watershed of concern. In some cases, loading capacity may vary within the watershed of concern (e.g., toxics loading capacity may be higher in areas with high water mixing rates than in backwater areas with poor water exchange), and in different time periods (e.g. nutrient loading capacity may be lowest during high temperature summer low flow periods). The basis for spatial and temporal variations in loading capacity estimates should be discussed in detail.

6. TMDLs and Individual Load and Wasteload Allocations

The document must identify the TMDL (total allowed pollutant amount) and its components: appropriate wasteload allocations for point sources and load allocations for nonpoint sources and natural background. If no point sources are present or anticipated, wasteload allocations are zero. If no nonpoint sources are present or anticipated, load allocations are zero. TMDLs and associated wasteload and load allocations must be expressed in quantitative terms [40 CFR 130.2 (e-i) and 40 CFR 130.7(c)].

The method of TMDL calculations must be discussed in detail. In some cases it will be appropriate to reserve (i.e., not allocate) a portion of the allowable loading capacity as part of the TMDL and its associated allocations. Such reserves may address the margin of safety requirement, account for sources which do not receive specific allocations, and/or to provide for future sources (although EPA advises providing for future sources through establishment of load allocations for future loading sources where feasible).

Separate wasteload and load allocations are needed for point and nonpoint sources, respectively. In cases where it is feasible, individual wasteload allocations should be established for each existing or anticipated future point source discharge, including NPDES-permitted stormwater discharges. However, circumstances may arise in which it is appropriate to set wasteload allocations that cover more than one discharge (e.g., discharges covered by a general permit). The State should coordinate with EPA prior to proposing a wasteload allocation which addresses more than one discharge, and clearly explain how the group wasteload allocation would be implemented.

Load allocations for nonpoint sources may be expressed as specific allocations for specific dischargers or as "gross allotments" to nonpoint source discharger categories. Separate nonpoint source allocations should be established for background loadings. Allocations may be based on a variety of technical, economic, and political factors. The methodology used to set allocations should be discussed in detail. It is advisable to include some assessment of the feasibility of the allocations in order to increase the likelihood that the TMDL can actually be attained through implementation actions and, accordingly, is sufficient to be approved by EPA.

TMDLs (and thus, load allocations and wasteload allocations) can be expressed as *"mass per time, toxicity, or other appropriate measure"*, depending on the type of waterbody and the sources that contribute to impairment. When using allocations in some *"other appropriate measure"* a discussion of why the *"other appropriate measure"* was used is necessary. *"Other appropriate measures"* may include an estimate of the percent reduction in discharge of the pollutant of concern which is needed to attain water quality standards. Where the percent reduction approach is used, the specific pollutant loading baseline against which the reductions are to be measured must be specified. For example, if the water quality impairment is due to excessive sedimentation from upland conditions, then the allocations may relate to the decrease in amount of erosion from uplands. If the problem is sedimentation related to channel conditions, then the allocations may relate to the decrease in the amount of bank erosion or the increase in stream stability.

Load allocations can be expressed in many ways. It is important to express load allocations in ways that can be implemented and monitored effectively. Where feasible, load allocations should be expressed in terms of:

- individual discharge location,
- individual land ownership, or
- individual land area subject to management jurisdiction by a single entity.

Where it is infeasible to set load allocations in these terms, load allocations may be expressed in the following ways:

- by pollutant discharge process (e.g. landslides),
- by land use type (e.g., rangeland),
- by land characteristics (e.g., geologic type)
- by discharger group (e.g. construction sites),
- by tributary subbasin area,
- by waterbody segment, or
- other discreet source description method approved by EPA.

In some TMDLs, it will be appropriate to express load allocations in terms of multiple classifications. Examples may include:

- lands managed for timber harvest with slopes greater than X% or less than X%,
- row crop lands located within 1000 feet of perennial streams or outside that zone, or
- unpaved roads within the A, B, and C subbasins of a larger watershed.

Federal regulations do not establish specific criteria which must be considered in dividing and allocating any available loading capacity between contributing sources. The State may consider a mix of the following allocation criteria (see Technical Support Document for Water Quality Based Permit Decisions (EPA, 1991) for more information):

- technical and engineering feasibility,
- cost or relative cost,
- economic impacts/benefits,
- cost effectiveness,
- fairness/equity,
- ability to monitor implementation and effectiveness,
- assurance and timeliness of attainment of the TMDL and water quality standards,
- relative source contributions, and/or
- other appropriate criteria.

7. Margin of Safety

The TMDL document must describe an explicit and/or implicit margin of safety for each pollutant [40 CFR 130.7(c)].

An explicit margin of safety can be provided by reserving (not allocating) a portion of the loading capacity identified for the waterbody for the pollutant of concern. An implicit margin of safety can be provided by making and documenting conservative assumptions used in the TMDL analysis. The TMDL submittal must provide a detailed explanation of the basis for margin of safety which shows why it is adequate to account for uncertainty in the TMDL. Where an implicit margin of safety is provided, the submittal should include a specific discussion of sources of uncertainty in the analysis and how individual analytical assumptions or other provisions adequately account for these specific sources of uncertainty.

Different analysis steps in TMDL development will involve different levels of uncertainty in the accuracy of results. TMDL developers should consider and document the types of uncertainty involved in each step of the analysis. Because TMDLs must account for uncertainties in the analysis, the different sources of uncertainty should be summarized. A margin of safety is required in the TMDL to account for uncertainty in the understanding of the relationship between pollutant discharges and water quality impacts. In any case, assumptions must be stated and the basis behind the margin of safety must be documented. The margin of safety is not meant to compensate for a failure to consider known sources.

8. Seasonal Variations and Critical Conditions

The TMDL document must describe the method used to account for seasonal variations and critical conditions (e.g., stream flows, pollutant loadings, and other water quality parameters) in the TMDL(s) [40 CFR 130.7(c)].

Pollutant discharges and associated effects on beneficial uses may vary in different years and at different times of the year. The TMDL developer should evaluate how seasonal or interannual variations in loadings, flows, pollutant fate and transport, pollutant effects, ecological conditions or other factors affect the waterbody of concern in TMDL. TMDLs are required to demonstrate how seasonal variations and critical conditions were accounted for in the TMDL analysis in order to ensure that the TMDL results in attainment of water quality standards throughout the year. The TMDL document must show how the TMDL accounts for seasonal variations and critical conditions concerning receiving water flow (e.g. low flow during drought periods), receiving water conditions (e.g. temperature), beneficial use impacts (e.g., key aquatic life stages), pollutant loadings (e.g., high flow nonpoint source runoff), and other environmental factors which affect the relationship between pollutant loading and water quality impacts. This element is required in order to ensure that the TMDL will protect the receiving water during the periods in which it is most sensitive to the impacts associated with the pollutant(s) of concern.

9. Public Participation

The TMDL package must document the provision of public notice and public comment opportunity concerning TMDL calculations; and explains how public comments were considered in the final TMDL(s) [40 CFR 130.7(c)(1)].

Minimum requirements for public participation for state adopted and EPA established TMDLs are discussed in the following section. However, there are additional ways of providing for public participation in TMDL development beyond the minimum. Table 1 on the following page summarizes three models of stakeholder participation and discusses some advantages and disadvantages of each model. These examples do not cover all approaches to providing for public participation but are intended to illustrate a range of viable public participation models. Although the State can address minimum federal requirements concerning public participation by providing a 30 day notice and comment period and preparing a comment responsiveness summary, EPA encourages that, where feasible, the State communicate with the public earlier in the process of developing a particular TMDL to discuss the TMDL approach and stakeholder involvement opportunities.

10. Technical Analysis

The TMDL document must provide an appropriate level of technical analysis supporting all TMDL elements [40 CFR 130.2(i) and 40 CFR 130.7(c)].

The State may include needed technical analysis in the TMDL document, submit copies of supporting documentation providing technical analysis supporting the TMDL, or cite documents in the State's administrative record which discuss the supporting technical analysis in detail. If the State cites documents as the basis for technical findings in the TMDL which are not submitted with the TMDL package, the TMDL document must clearly summarize the technical analysis supporting the findings concerning individual TMDL elements. In addition, the State should maintain these documents in its administrative record for review by EPA on request.

Table 1: Public Participation Models

Model	Characteristics	Advantages	Disadvantages
Public Notice and Comment	- provides formal opportunity to review proposed TMDL, may include public hearings - responses are provided to public comments in final TMDL or in a responsiveness summary - State or EPA explain how comments were considered in the final decision	- less time and resource intensive - satisfies minimum public participation requirements - avoids repetition of effort where TMDL based on previous, uncontroversial decisions	- interested parties will not hear about TMDL - reduces chance of local support and buy-in - developing comment responses can be time consuming and difficult - may be dissatisfying to stakeholders who want more involvement
Stakeholder Consultation Plus Public Comment Period	- developer meets several times with stakeholders during TMDL development - developer informs group of progress and draft analysis, seeks input	- involved stakeholders not taken by surprise - increases chances for local support/buy in - earlier identification of tough or contentious issues	- moderately time/resource intensive - may be dissatisfying to stakeholders who want more involvement - difficult to manage expectations
Extensive Stakeholder Collaboration Plus Public Comment Period	- stakeholders involved from outset in different TMDL elements - stakeholders may do substantial analysis, not just review state work - stakeholders may attempt to seek agreement on TMDL content	- best chances for local support/buy in - improves ability to identify and evaluate implementation measures - may reduce resources needed for analysis since other parties do some analysis	- very time/resource intensive - may be unrealistic to get consensus or agreement on TMDL content - problematic for TMDLs with tight, inflexible deadlines - may be unsatisfying to interested stakeholders-- extensive time commitments required may be infeasible for many interested groups

Requirements For The Phased Approach To TMDLs

EPA has described an approach to TMDL development in situations where data and information needed to determine the TMDL and associated allocations are limited. This "phased approach" to TMDLs enables States to adopt TMDLs and begin implementation while collecting additional information needed to review and, if necessary, revise TMDL elements based on new information (see Guidance for Water Quality Based Decisions-- The TMDL Process (EPA, 1991) for more information). For TMDLs developed under the "phased approach", the following additional element must be included in the TMDL submittal:

11. Monitoring and Review Plan

TMDLs developed under phased approach must identify specific implementation actions, monitoring plans and a schedule for considering revisions to the TMDLs.

EPA also recommends that any TMDL include a monitoring and review process whether it is developed pursuant to the phased approach or not.

Requirement Concerning Point/Nonpoint Source Allocation Practicability

For waters affected by both point source and nonpoint source discharges, TMDL documents must address the following additional requirement. Note that EPA has also established national policies concerning reasonable assurances as part of TMDL implementation plans, which are discussed in the implementation section of this guidance.

12. Showing of Practicability of Nonpoint Source Load Allocations

Where point source(s) receive less stringent wasteload allocations because nonpoint source reductions are expected and reflected in load allocations, the TMDL must include a demonstration that nonpoint source loading reductions needed to implement load allocations are actually practicable [40 CFR 130.2(i) and 122.44(d)].

This means that the load allocations are technically feasible and reasonably assured of being implemented in a reasonable period of time. Reasonable assurances may be provided through use of regulatory, non-regulatory, or incentive based implementation mechanisms as appropriate but must include an actual demonstration that the measures identified will actually obtain the predicted reductions and that the State is able to assure this result.

2.2 Other EPA Guidance Concerning TMDL Content

In addition to these minimum required elements, EPA recommends that all TMDLs should contain the following elements in order to facilitate public and EPA review of the TMDL:

Problem Statement

The process of problem definition identifies the context for TMDL development and describes the water quality standards issue(s) which prompted development of the TMDL. The problem statement should identify:

- name(s) and location(s) of waterbody segments for which the TMDL is being developed,
- the pollutant(s) for which the TMDL is being developed and information about why the pollutant(s) are being addressed,
- the specific applicable water quality standard(s) for those pollutants,
- a description of the water quality impairment or threat which necessitated TMDL development, and
- adequate background information about the watershed setting for the TMDL to help the reader understand the key water quality, pollutant discharge, land use, and resource protection issues in the watershed.

Administrative Record Keeping

An administrative record that supports development and approval of the TMDL should also be prepared. Components of the administrative record should include all materials used to develop the TMDL and make decisions, including any data or references that were used, records of any correspondence, and other background materials. Such a record is needed in order to ensure that the public has the opportunity to review documents which formed the basis for the TMDL. In addition, EPA may request access to documents upon which the State relied in developing a TMDL if necessary to determine whether a TMDL submittal complies with federal requirements. As discussed above under Technical Analysis, the State should maintain in its administrative record copies of technical documents which serve as the basis for one or more findings contained in the TMDL submittal to EPA.

2.3 Federal Requirements and Guidance Concerning TMDL Implementation

States are not currently required to include implementation plans as part of the TMDL submittal. However, federal regulations require States to incorporate TMDLs in the State Water Quality Management Plan along with adequate implementation measures to implement all aspects of the plan (including the TMDLs) [40 CFR 130.6]. Therefore, TMDL implementation measures must be identified by the State and submitted for EPA's review, either concurrent with the TMDL or afterward. EPA suggests that the implementation plan should be prepared and submitted concurrent with the TMDL. If the State plans to prepare the implementation plan after the TMDL, the State's TMDL submittal should provide a schedule for developing the implementation plan.[4] Federal regulations do not currently provide that EPA will establish an implementation plan for TMDLs established by EPA. However, EPA may make implementation recommendations as part of TMDLs it establishes. States should consider EPA's implementation recommendations at the time the State develops its implementation measures for the TMDL and should adopt these measures into the Basin Plan unless the State identifies alternative measures which are sufficient to implement the TMDL.

The State's TMDL implementation plan submittal should describe planned implementation actions or, where appropriate, specific process(es) and schedule(s) for determining future implementation actions. The implementation plan needs to be sufficient to implement all wasteload and load allocations in a reasonable period of time. TMDL(s) and implementation measures are formally incorporated into the water quality management plan through the state's established process for amending that plan. Water quality management plan revisions must be consistent with other existing provisions of the water quality management plan [40 CFR 130.6].

[4] As discussed in Section 2.4 below, the State of California's position is that State law usually requires the Regional Boards to adopt implementation provisions concurrent with TMDLs in order to meet State Basin Planning requirements for TMDL adoption.

Reasonable Assurances Concerning Implementation

EPA's national policy is that all TMDLs are expected to provide reasonable assurances that they can and will be implemented in a manner that results in attainment of water quality standards (EPA, 1997). This means that the wasteload and load allocations are technically feasible and reasonably assured of being implemented in a reasonable period of time. Reasonable assurances may be provided through use of regulatory, non-regulatory, or incentive based implementation mechanisms as appropriate.

TMDLs and NPDES Permits

Discharge permits issued under Clean Water Act Section 402 (the NPDES program) contain effluent limitations for individual pollutants. These effluent limitations must be consistent with any wasteload allocations developed as part of TMDLs approved or established by EPA. This provision applies to all types of NPDES permits (including stormwater and general permits). If these procedures are not addressed in the TMDL, the NPDES permit writer determines the specific method of assuring that a new or revised permit is consistent with its wasteload allocation at the time the permit is scheduled for issuance.

To avoid permitting problems, EPA recommends that the State evaluate how waste load allocations will be translated into NPDES permit limits as part of developing the TMDL implementation plan. EPA believes it is useful to do this concurrent with TMDL development. Consideration of permitting issues will also assist in evaluating the practicability of WLAs during the allocation step of TMDL development. Permitting issues which the State should consider in establishing WLAs include:

- whether WLAs and effluent limits will be expressed on a concentration and/or mass basis,
- whether pollutant trading is contemplated as part of the TMDL and WLAs,
- appropriate permit averaging periods,
- whether mixing zones are appropriate, and, if so, how they would be delineated, and
- ambient monitoring provisions.

TMDLs and Nonpoint Sources

There are few specific federal requirements concerning implementation of nonpoint source controls pursuant to load allocations. As discussed above, the State must demonstrate reasonable assurances that the load allocations will be (1) set at sufficient levels to attain Water Quality Standards and (2) implemented, if wasteload allocations were relaxed based on the expectation of nonpoint source reductions. EPA's national policy is that all implementation plans for all TMDLs will provide reasonable assurances that all wasteload and load allocations will be implemented in a timely manner. EPA recommends evaluating at a specific level how load allocations will be implemented as part of the TMDL implementation plan, and believes it is useful to do this concurrent with TMDL development. Consideration of potential nonpoint source management approaches and the effectiveness of available management practices will

assist in evaluating the practicability of load allocations and assessing whether there is reasonable assurance that the TMDL will be implemented and result in attainment of water quality standards.

2.4 State of California-Related Requirements

In addition to federal requirements, the Regional Water Quality Control Boards and State Water Resources Control Board are required to comply with various additional requirements under State law in order to develop, adopt, and submit a TMDL and associated implementation measures to EPA. These State-related requirements are summarized below in table 2, based on material provided to EPA by the State. The process through which the State develops these required materials is discussed in the following section. In addition, Appendix A to this guidance provides a legal opinion from the Office of Chief Counsel, State Water Resources Control Board, which describes economic considerations in TMDL development and basin planning which stem from State law.

EPA does not review TMDL submittals for compliance with State-related requirements, and they are listed here for information purposes only. Interested parties should contact the State or Regional Board TMDL contacts for more definitive guidance concerning State-related requirements.

Table 2: State Basin Planning Required Elements

Requirements For Basin Plan Amendment	Summary
Administrative Record	Record of information used to make the staff decision and only admissible evidence during legal challenge
Notification	Provide State Board staff of draft amendment for review of state board and Office of Administrative Law (OAL) requirements, State Board and EPA review of TMDL staff report draft
Index	List of contents, and number pages
Public Process	Evidence of meetings, sign in sheets, mailing lists
Public Comment	Comment letters from 45 days between Public draft presentation and Board presentation
Records cited	List of records on which amendment is based
Peer Review and report	Route through Division of Water Quality (DWQ) coordinator, allow time for technical peer review
TMDL introduction	Confirm that supporting material in chapter introduction is sufficient and diagrams and basin plan material are updated
CEQA check list	Documents no environmental impact assumption
Amendment	Copy as presented for Regional Board consideration (may be the same as required for printing and distribution below)
Transcript	Of regional board meeting where amendment was approved

Requirements For Basin Plan Amendment	Summary
Exhibit	Copies of those exhibits presented at hearing by staff and public
Late Public Comments	Summary of verbal responses to comments made at hearing and to those received after formal comment period
Economic Cost Analysis	Analysis of costs of agricultural controls, performance standards, and/or treatment requirements mandated by amendment (see Appendix A for details.)
Staff Report/TMDL	Rationale for amendment
Adopted Amendment	Adopted amendment and signed resolution
Printing and Distribution	Basin Plan update inserts mailed to current holders and updated 'record of amendments' page for insertion
Required Approvals and Concurrences	
Regional Water Board	approves TMDL and basin plan amendment
State Water Board	approves TMDL and basin plan amendment following Regional Board action
Office of Administrative Law	concurs that basin plan amendment meets State Administrative Procedures Act requirements
U.S. EPA	approves state submitted TMDL and basin plan amendment

3. Steps in TMDL Development and Approval

There are likely to be three approaches through which TMDLs are completed in California– (1) State adoption, (2) EPA establishment, and (3) State adoption following extensive 3rd party assistance in developing TMDL component parts. This section describes the procedural steps in completing TMDLs through these 3 approaches.

3.1 State-Adopted TMDLs

This approach entails preparation of a TMDL by Regional Board staff, approval by the Regional Board, approval by State Board, approval by Office of Administrative Law, and approval by U.S. EPA. The steps in this process are summarized in table 3 below.

Table 3: Steps in Developing and Adopting State-Adopted TMDLs

Step	Timing	Responsible Party
Develop draft TMDL/ Basin Plan Amendment(BPA) - usually involves detailed workplan and may involve significant stakeholder involvement	varies	Regional Board staff (often with substantial assistance from other parties)
Provide TMDL/BPA and record for peer review	varies	Regional Board staff
Peer review completed	within 60 days	Peer reviewer(s)
Respond to peer review	varies	Regional Board staff
Provide draft TMDL/BPA to EPA for review	varies	Regional Board and EPA staff
Open public comment period	45 days	Regional Board staff
Hold public hearing	varies	Regional Board
Adopt TMDL, considering public comments	varies	Regional Board
Transmit BPA/TMDL and record to State Board	varies	Regional Board staff
Prepare approval package for State Board	varies	State Board staff
Open comment period	30 days	State Board staff
Hold meeting to hear public comments	varies	State Board
Approve TMDL considering public comments	varies	State Board
Transmit BPA/TMDL and supporting record to Office of Administrative Law	varies	State Board Staff
Review BPA/TMDL for consistency with State Administrative Procedures Act	within 60 days	OAL staff
Transmit concurrence/comments to State Board	within 60 days	OAL staff
(If needed) Resolve OAL comments	varies	State and Regional Board staff
(If needed) obtain OAL concurrence	varies	State Board staff, OAL staff
Transmit final TMDL/BPA and record to EPA	varies	State Board staff
Approve or disapprove TMDL	30 days	EPA
If disapprove, establish TMDL	within 30 days after disapproval	EPA
Open comment period	30 days min.	EPA
Transmit final TMDL to State for inclusion in Basin Plan after considering public comments and making changes if needed	within 30 days after comment period	EPA

3.2 EPA-Established TMDLs

EPA's process for establishing a TMDL is more straightforward than the State's process and is summarized in table 4.

Table 4: EPA's Process for Establishing TMDLs

Step	Timeline	Responsible Party
Develop draft TMDL	varies-	EPA staff, often with help from State or other parties
Public notice draft TMDL	30 day minimum	EPA staff
Hold public hearing if warranted	varies	EPA staff
Develop final TMDL, considering public comment	varies	EPA staff
Establish and transmit final TMDL to State for inclusion in Basin Plan with implementation measures	immediately upon establishment	EPA Division Director

3.3 Process Steps for Third Party Involvement in TMDL Development

Several TMDLs have been developed in California for which third parties (e.g., dischargers, land managers, or citizen groups) have prepared significant portions of the TMDL analysis or provided support for TMDL development. Third parties can assist in TMDL development in several capacities. They may include:

- developing significant work products with State and/or EPA oversight,
- administering stakeholder meetings and organizations,
- providing technical support for individual components of the TMDL,
- providing specific funding assistance for individual TMDL analysis elements, and
- providing expert review of specified components of TMDLs.

Table 5 suggests steps for more intensive involvement of third parties in TMDL development. EPA strongly recommends that these steps be followed in order to ensure that intensive third party involvement in TMDL development is productive. Only the State water quality agency or EPA are authorized to actually adopt or establish TMDLs, but third parties can assist a great deal in TMDL work in a well-managed process. Where a particular stakeholder group or discharger plays an enhanced role in TMDL development, the TMDL development process should provide specific opportunities for the Regional Board and other interested stakeholders to participate in the selection and application of the methods used to develop TMDL components. These extra opportunities for involvement in review of 3rd party efforts are needed to ensure that the selected approaches are valid and balanced.

Table 5: Steps for Involving Third Parties in TMDL Analysis

Step	Timeframe	Responsible Party
Contact Regional Board to discuss potential TMDL-related work (also contact EPA if consent decree TMDL involved)	as soon as possible	Third party organization with work conducted as part of a public process
Regional Board and Third Party establish written agreement specifying resource commitments, work to be done by third party, technical workplan,	as soon as possible	Regional Board and Third Party (and EPA if consent decree TMDLs involved)

Step	Timeframe	Responsible Party
milestones, interim deliverables, schedules, public involvement provisions, and project dependencies.		
Designate State staff contact who will work with Third Party throughout project to ensure work products are consistent with all TMDL requirements	as soon as possible	Regional Board staff
Neutral peer reviewers review technical approach	as soon as possible (can be done earlier)	peer reviewers identified and overseen by Regional Board, (also EPA if consent decree involved), third party funds
Adjust approach as needed to address peer review comments	varies	Third Party, with Regional Board oversight
Perform activities/analysis per workplan	per schedule	Third party with Regional Board staff oversight
Deliver interim/final products to Regional Board (and EPA if consent decree TMDLs involved)	per schedule	Third party with Regional Board oversight
Public review/adoption process as described above	see above	see above

3.4 How Does EPA Review and Establish TMDLs?

EPA Region 9 staff usually review draft TMDLs and provide comments to the State before the State adopts the TMDLs, in order to help ensure that the TMDLs include all federally-required elements.

The Clean Water Act and EPA regulations require EPA to review State-adopted TMDLs and either approve or disapprove the TMDLs within 30 days of final submission. EPA reviews TMDL submissions to ensure that:

- all TMDL elements required by the Clean Water Act and EPA regulations are present,
- adequate explanations and documentation are provided for each element, and
- the TMDL will result in attainment of applicable State water quality standards.

EPA Region 9 generally uses a checklist prepared by Region 9 to document its review of the TMDL submission (see Appendix B). The checklist identifies each TMDL element required by the Clean Water Act or EPA's regulations, briefly describes the element, and provides a brief explanation of EPA's analysis indicating that the element is or is not consistent with federal requirements. The checklist also addresses TMDL implementation elements in order to assist in review of State TMDL submissions which include implementation measures.

If EPA finds that all required elements are present and are adequately documented, and that the TMDL is therefore expected to result in attainment of water quality standards, EPA approves the TMDL. If any required element is missing or insufficiently documented, EPA attempts to clarify the submission during the 30 day review period. If the State does not provide

the missing TMDL element(s) or does not clarify or document the basis for its findings, EPA disapproves the TMDL.[5] If EPA disapproves the TMDL, it has 30 days to establish a TMDL which meets federal requirements.

EPA is not required to provide for public review and comment on its decision to approve or disapprove a State-established TMDL because the State provides the public with the opportunity to review and comment on the TMDL prior to State adoption of the TMDL. If EPA establishes a TMDL, EPA provides the public with an opportunity to review and comment on the TMDL, considers public comments concerning the EPA-established TMDL, and makes changes to the TMDL if warranted based on comments received from the public.

After EPA completes its review of the final TMDL submittal, staff complete a staff report, checklist, and decision letter. The Water Division Director is the official who actually makes the final decisions concerning TMDL submissions. The decision letter signed by the Water Division Director is transmitted along with the staff report and checklist to the Executive Director of the State Water Resources Control Board with a copy to the Executive Officer of the appropriate Regional Water Quality Control Board.

EPA sometimes establishes TMDLs without having disapproved a State TMDL submission (e.g., to meet court-ordered schedules or at the request of the State). EPA-established TMDLs must contain the minimum federally required elements mandated by the Clean Water Act and EPA regulations, and result in attainment of water quality standards. When EPA establishes a TMDL, it provides an opportunity for public review and comment on the TMDL, prepares a public comment responsiveness summary, and makes changes in the TMDL if needed based on comments received. The TMDL is established through the action of the Water Division Director. The final TMDL is transmitted to the Executive Director of the State Water Resources Control Board with a copy to the Executive Officer of the appropriate Regional Water Quality Control Board for inclusion in the Basin Plan by the State.

4. Additional Guidance for TMDL Development

4.1 Water Quality Standards and TMDLs

Under the Clean Water Act and EPA's regulations, the TMDL process is designed to implement existing water quality standards in waters where water quality is not good enough to meet those standards. In most situations, existing water quality standards will need to be applied in developing TMDLs. For many TMDLs, the State will need to interpret narrative objectives,

[5] If the State provides insufficient opportunities for public participation or does not describe how public comments were considered in the final TMDL, EPA may open a comment period and make its final decision following the close of the comment period, after considering comments received from the public.

use nonattainment, or (possibly) antidegradation policies quantitatively to develop TMDL numeric targets if no numeric standards are in effect or numeric standards are not designed to address the impairment of concern. Federal regulations do not require the state to adopt TMDL numeric targets as state water quality standards. To assist in interpreting narrative objectives, beneficial use designations, and/or antidegradation policies, TMDL writers should consult applicable California implementation procedures for water quality standards.

In some cases, it may be appropriate to reevaluate the appropriateness of water quality standards for the targeted waters. Separate federal regulations provide for modifying water quality standards for individual water bodies when specified showings can be made. Additional guidance documents concerning modification of water quality standards are listed in the references. As early in the process as possible, parties who are interested in seeking revisions of water quality standards on a site-specific basis should consult with Water Quality Standards program staff at EPA Region 9, the State Water Resources Control Board, and the appropriate Regional Water Quality Control Board to discuss the suitability of standards modifications in particular situations.

4.2 TMDL Planning and Project Management

Each TMDL project is different. Planning and managing a complex TMDL project can be difficult. The following checklist summarizes factors TMDL analysts should consider in initiating a TMDL project:

- How long to you have to complete the TMDL?
- Do you face resource constraints? What staff, contractor, or stakeholder resources are available? Are resources assured for future years?
- Can other agencies, stakeholders, or programs help you do the TMDL?
- How complex are the watershed setting and pollutant issues of concern?
- What information, data, and prior efforts are available regarding the watershed setting and pollutant of concern?
- What is the scope of the TMDL? What area and what pollutants are to be addressed?

EPA strongly encourages the State to develop detailed workplans to guide the technical analysis and stakeholder participation aspects of the TMDL before starting the TMDL. The State should distribute workplans to stakeholders for input if time and resources allow. The workplans should include specific information on technical methods, interim milestones in TMDL development, responsible parties, schedules, interim deliverables, and project dependencies. It is often useful to plan a TMDL timeline by working backwards from an existing decision deadline to determine how much time is actually available to develop the TMDL. In addition, the workplans should:

- include estimated resources/costs of the project and the specific method of funding to be used, including provisions for contract assistance where needed,
- factor in time for review of the draft TMDL by EPA and interested stakeholders,

- provide some flexibility to account for unforeseen events, and
- provide for each step prescribed in the State and federal administrative processes.

TMDL planners should assess whether it is feasible to coordinate with related program decisions/activities to reduce the amount of work done solely to support the TMDL decision. Examples of coordination opportunities include:

- standards revisions already planned or underway,
- discharge permitting decisions,
- rotating basin management approaches or other watershed management planning (if any),
- development of environmental impact statements or reports for planned projects, and
- other activity in watershed (e.g., hydropower licenses issued by Federal Energy Regulatory Commission, habitat conservation plans developed pursuant to Federal Endangered Species Act, Section 319 nonpoint source management projects).

In many locations in California, there is considerable interest in developing TMDLs through a "watershed approach". The State should consider the following factors which, in EPA's experience, are key to effectively melding TMDL development and locally focused watershed management planning:

- Regional Boards should clarify that TMDL (and perhaps other regulatory) decisions that will need to be made and establish timeframes (if any) for making these decisions.
- These efforts should start several years before a TMDL is scheduled for adoption because this approach generally takes substantial time to complete.
- The State should obtain agreement to ground rules by all participants, including ground rules with respect to regulatory deadlines.
- The State should secure firm commitments from stakeholders concerning participation, funding support, etc.
- The State should use existing stakeholder groups where feasible, if those groups are interested in working on TMDL issues.
- The group should develop a detailed schedule which contemplates key decisions and dependencies related to the minimum TMDL requirements and how they are completed.
- State water quality staff should participate fully as stakeholders and have the time and resources available which are necessary to do so.

5. Sources of Additional Information and Guidance

Further information concerning TMDL development can be obtained from EPA Region 9 by visiting the Region 9 web site at www.epa.gov/region09/water/tmdl or by calling the Region 9 Water Division office at (415) 744-2012. In addition, information concerning the national TMDL program and national reference documents can be obtained by visiting the EPA Headquarters web site at www.epa.gov/OWOW/tmdl. Several cited references which provide useful guidance concerning TMDLs and related programs are listed below, and can be obtained or will soon be available through the EPA Headquarters web site.

EPA, 1990. *Technical Support Document for Water Quality-Based Toxics Control.* EPA 505-2-90-001.

EPA, 1991. *Guidance for Water Quality-Based Decisions: The TMDL Process.* EPA 440/4-91-001.

EPA, 1996. *Catalog of Publications: Office of Science and Technology.* EPA-820-R-96-001. (Wasteload Allocation Guidance Series).

EPA, 1997. New Policies for Establishing and Implementing Total Maximum Daily Loads (TMDLs). Memorandum from Robert Perciasepe to Regional Administrators, August 8, 1997.

EPA, 1999. *Protocol for Developing Sediment TMDLs.* EPA 841-B-99-004, October, 1999.

EPA, 1999. *Protocol for Developing Nutrient TMDLs.* EPA 841-B-99-007, November, 1999.

Documents which should assist in considering modifications of water quality standards on a site specific basis include:

EPA 1983-84. *Technical Support Manual: Waterbody Surveys and Assessments for Conducting Use Attainability Analyses* Vol. 1, EPA 440/4-86-037, 1983; Vol. 2 Estuarine Systems, EPA 440/4-86-038, 1984; Vol. 3: Lake Systems, EPA 440/4-86-039, 1984.

EPA Region 9, 1992. Guidance for Modifying Water Quality Standards and Protecting Effluent-Dependent Ecosystems. Interim Final, June 1992.

EPA, 1993. *Water Quality Standards Handbook.* 2nd Edition. EPA 823-B-93-002, September 1993.

EPA, 1994. *Interim Guidance on Determination and Use of Water Effect Ratios for Metals.* EPA 823-B-94-001, February 1994.

EPA, 1995. *Interim Economic Guidance for Water Quality Standards: Workbook.* EPA 823/B-95-002.

Appendix A: "Economic Considerations in TMDL Development and Basin Planning"-- An Opinion From Office of the Chief Counsel, California State Water Resources Control Board

TMDL analysts with the State and Regional Water Boards and other interested stakeholders have requested clarification concerning economic analysis considerations in the TMDL process. Neither the federal Clean Water Act nor EPA regulations require that any particular form of economic analysis must be conducted to meet federal requirements for TMDL adoption. The Office of Chief Counsel, State Water Resources Control Board, issued the following memorandum addressing economic analysis requirements under State law. The Office of Chief Counsel is solely responsible for the content of the memorandum. EPA had no role in its preparation, and we are including it with the guidance solely to convey the State's legal analysis of State requirements.

Winston H. Hickox
Secretary for Environmental Protection

State Water Resources Control Board

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Gray Davis
Governor

TO: Stefan Lorenzato
TMDL Coordinator
Division of Water Quality

FROM: Sheila K. Vassey
Senior Staff Counsel
OFFICE OF CHIEF COUNSEL

DATE:

SUBJECT: ECONOMIC CONSIDERATIONS IN TMDL DEVELOPMENT AND BASIN PLANNING

ISSUE

When are the Regional Water Quality Control Boards (Regional Water Boards or Boards) legally required to consider economics in Total Maximum Daily Load (TMDL)[1] development and water quality control planning (basin planning)?[2]

CONCLUSION

The Regional Water Boards, in general, adopt TMDLs as basin plan amendments. Under state law, there are three triggers for Regional Water Board consideration of economics or costs in basin planning. These are:

- The Regional Water Boards must estimate costs and identify potential financing sources in the basin plan before implementing any agricultural water quality control program.

- The Boards must consider economics in establishing water quality objectives that ensure the reasonable protection of beneficial uses.

[1] See 33 U.S.C. § 1313(d); 40 C.F.R. § 130.7.

[2] See Wat. Code §§ 13240-13247.

- The Boards must comply with the California Environmental Quality Control Act (CEQA)[3] when they amend their basin plans. CEQA requires that the Boards analyze the reasonably foreseeable methods of compliance with proposed performance standards and treatment requirements. This analysis must include economic factors.

Economic factors come into play under federal law when the Regional Water Boards designate uses. Specifically, the Boards can decide not to designate, dedesignate, or establish a subcategory of, a potential use where achieving the use would cause substantial and widespread economic and social impact.

DISCUSSION

I. STATE LAW

Under federal and state law, the Regional Water Boards are required to include TMDLs in their basin plans.[4] There are three statutory triggers for an economic or cost analysis in basin planning. These triggers are:

- adoption of an agricultural water quality control program;
- adoption of water quality objectives; and
- adoption of a treatment requirement or performance standard (CEQA).

Each category is briefly discussed below.

A. Agricultural Water Quality Control Program

Agricultural activities are significant sources of nonpoint source pollution. Many waterbodies in the state are impaired due to one or more agricultural operations. As a result, the Regional Water Boards will be faced with developing programs to control agricultural activities, as part of TMDL development.

Under the Porter-Cologne Water Quality Control Act (Porter-Cologne),[5] before a Regional Water Board implements an agricultural water quality control program, the Board must identify

[3] Pub. Resources Code § 21000 et seq.

[4] See 33 U.S.C. § 1313(d); 40 C.F.R. § 130.7(d)(2) (TMDLs must be incorporated into the state's water quality management plan. In California the basin plans are part of the state's water quality management plan.); Wat. Code §§ 13050(j), 13242.

[5] Wat. Code § 13000 et seq.

the total cost of the program and potential sources of financing.[6] This information must be included in the basin plan.

The statute does not define "agricultural" programs. The Legislature has, however, defined agricultural activities elsewhere to mean activities that generate "horticultural, viticultural, forestry, dairy, livestock, poultry, bee, or farm product[s]."[7] Because "agricultural" programs under Porter-Cologne are not restricted to particular activities, presumably, the Legislature intended that the term be interpreted broadly. Thus, the Regional Water Boards should identify costs and financing sources for agricultural water quality control programs" covering not only typical farming activities but also silviculture, horticulture, dairy, and the other listed activities.

The statute focuses only on costs and financing sources. The statute does not require the Regional Water Boards to do, for example, a cost-benefit analysis or an economic analysis.

B. Water Quality Objectives

Porter-Cologne requires that the Regional Water Boards take "economic considerations", among other factors, into account when they establish water quality objectives.[8] The objectives must ensure the reasonable protection of beneficial uses and the prevention of nuisance.[9]

Attached to this memorandum is a 1994 memorandum containing guidance on the consideration of economics in the adoption of water quality objectives.[10] The key points of this guidance are:

- The Boards have an affirmative duty to consider economics when adopting water quality objectives.
- At a minimum, the Boards must analyze: (1) whether a proposed objective is currently being attained; (2) if not, what methods are available to achieve compliance with the objective; and (3) the costs of those methods.

[6] *Id.* § 13141.

[7] Food & Agr. Code §§ 564(a), 54004.

[8] Wat. Code § 13241. The other factors include the past, present, and probable future beneficial uses of water; environmental characteristics of the hydrographic unit under consideration; water quality conditions that could reasonably be achieved through the coordinated control of all factors affecting water quality in the area, the need for developing housing, and the need to develop and use recycled water.

[9] *Ibid.*

[10] Memorandum, dated January 4, 1994, from William R. Attwater, Chief Counsel, to Regional Water Board Executive Officers and Attorneys, entitled "Guidance on Consideration of Economics in the Adoption of Water Quality Objectives".

- If the economic consequences of adoption of a proposed objective are potentially significant, the Boards must state on the record why adoption of the objective is necessary to ensure the reasonable protection of beneficial uses or the prevention of nuisance.

- The Regional Water Boards can adopt objectives despite significant economic consequences.

- The Boards are not required to do a formal cost-benefit analysis.

C. CEQA

The Regional Water Boards must comply with CEQA when they amend their basin plans.[11] The State Resources Agency has certified the basin-planning program as exempt from the requirement to prepare environmental documents under CEQA.[12] In lieu of preparing an environmental impact report or negative declaration, the Boards must comply with the State Water Resources Control Board's regulations on exempt regulatory programs when they amend their basin plans.[13] These regulations require the Boards to prepare a written report that analyzes the environmental impacts of proposed basin plan amendments.[14] In general, CEQA requires the Regional Water Boards to consider economic factors only in relation to physical changes in the environment.[15]

CEQA also has specific provisions governing the Regional Water Boards' adoption of regulations, such as the regulatory provisions of basin plans that establish performance standards or treatment requirements. The Boards must do an environmental analysis of the reasonably foreseeable methods of compliance with those standards or requirements.[16] They must consider economic factors in this analysis.

CEQA does not define "performance standard"; however, the term is defined in the rulemaking provisions of the Administrative Procedure Act.[17] A "performance standard" is a regulation that describes an objective with the criteria stated for achieving the objective.[18]

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[11] See Pub. Resources Code § 21080.

[12] See Cal. Code Regs., tit. 14, § 15251(g).

[13] See Cal. Code Regs., tit. 23, §§ 3775-3782.

[14] *Id.* § 3777.

[15] See Cal. Code Regs., tit. 14, § 15064(e).

[16] Pub. Resources Code § 21159.

[17] Gov. Code §§ 11340-11359.

[18] *Id.* § 11342(d).

TMDLs will typically include performance standards. TMDLs normally contain a quantifiable target that interprets the applicable water quality standard. They also include wasteload[19] allocations for point sources, and load allocations[20] for nonpoint sources and natural background to achieve the target.[21] The quantifiable target together with the allocations may be considered a performance standard. Thus, the Regional Water Board must identify the reasonably foreseeable methods of compliance with the wasteload and load allocations and consider economic factors for those methods. This economic analysis is similar to the analysis for water quality objectives discussed above. That is, the Regional Water Board should determine: (1) whether the allocations are being attained; (2) if not, what methods of compliance are reasonably foreseeable to attain the allocations; and (3) what are the costs of these methods.

II. FEDERAL LAW

Under federal law, economics can be considered in designating potential beneficial uses. Specifically, the federal water quality standards regulations allow a state to dedesignate, to decide not to designate, or to establish a subcategory of a potential beneficial use on economic grounds. To rely on this basis, the state must demonstrate that attaining the use is infeasible because the controls necessary to attain the use "would result in substantial and widespread economic and social impact."[22]

The states can take this action only for potential uses. These are uses that do not meet the definition of an "existing use". Existing uses are those uses actually attained in the water body on or after November 28, 1975.[23]

Attachment

[19] See 40 C.F.R. § 130.2(g). A wasteload allocation is the portion of the receiving water's loading capacity that is allocated to one of its existing or future point sources of pollution.

[20] See *id.* § 130.2(g). A load allocation is the portion of the receiving water's loading capacity that is attributed either to one of its existing or future nonpoint sources of pollution or to natural background sources.

[21] See *id.* § 130.2(i). A TMDL is the sum of the individual wasteload and load allocations.

[22] See *id.* § 131.10(g)(6).

[23] *Id.* § 131.3(e).

Appendix B: EPA Region 9 TMDL Review Checklist

EPA Region 9 uses this checklist to review TMDLs submitted for EPA Region 9 approval to ensure that the TMDLs meet all the requirements of the Clean Water Act and EPA's regulations concerning TMDL content. Because many TMDL submissions from California and other states also include TMDL implementation measures pursuant to EPA's regulatory requirements at 40 CFR 130.6, the checklist also includes review criteria for TMDL implementation measures. EPA regulations do not require the submission of implementation measures at the same time as TMDLs are submitted.

State: **Waterbodies:**
Pollutant(s): **Date of State Submission:**
Date Received By EPA: **EPA Reviewer:**

TMDL Review Criteria (per Clean Water Act Section 303(d) and 40 CFR 130.2 and 130.7)	**Approved**	**Comments**
1. Submittal Letter: State submittal letter indicates final TMDL(s) for specific water(s)/pollutant(s) were adopted by state and submitted to EPA for approval under 303(d).		
2. Water Quality Standards Attainment: TMDL and associated allocations are set at levels adequate to result in attainment of applicable water quality standards.		
3. Numeric Target(s): Submission describes applicable water quality standards, including beneficial uses, applicable numeric and/or narrative criteria. Numeric water quality target(s) for TMDL identified, and adequate basis for target(s) as interpretation of water quality standards is provided.		
4. Source Analysis: Point, nonpoint, and background sources of pollutants of concern are described, including the magnitude and location of sources. Submittal demonstrates all significant sources have been considered.		
5. Allocations: Submittal identifies appropriate wasteload allocations for point sources and load allocations for nonpoint sources. If no point sources are present, wasteload allocations are zero. If no nonpoint sources are present, load allocations are zero.		
6. Link Between Numeric Target(s) and Pollutant(s) of Concern: Submittal describes relationship between numeric target(s) and identified pollutant sources. For each pollutant, describes analytical basis for conclusion that sum of wasteload allocations, load allocations, and margin of safety does not exceed the loading capacity of the receiving water(s).		
7. Margin of Safety: Submission describes explicit and/or implicit margin of safety for each pollutant.		

8. Seasonal Variations and Critical Conditions: Submission describes method for accounting for seasonal variations and critical conditions in the TMDL(s)		
9. Public Participation: Submission documents provision of public notice and public comment opportunity; and explains how public comments were considered in the final TMDL(s).		
10. Technical Analysis: Submission provides appropriate level of technical analysis supporting TMDL elements.		
Note: **The following criteria do not apply to all TMDLs, but must be applied in the situations noted.**		
11. Monitoring Plan for TMDLs Under Phased Approach (where phased approach is used): TMDLs developed under phased approach identify implementation actions, monitoring plan and schedule for considering revisions to TMDL.		
12. Reasonable Assurances (for waters affected by both point and nonpoint sources): Where point source(s) receive less stringent wasteload allocations because nonpoint source reductions are expected and reflected in load allocations, implementation plan provides reasonable assurances that nonpoint implementation actions are sufficient to result in attainment of load allocations in a reasonable period of time. Reasonable assurances may be provided through use of regulatory, non-regulatory, or incentive based implementation mechanisms as appropriate.		
Implementation Plan Review Criteria (per Clean Water Act Section 303(e) and 40 CFR 130.6)		
13. Clear Implementation Plan: Submittal describes planned implementation actions or, where appropriate, specific process and schedule for determining future implementation actions . Plan is sufficient to implement all wasteload and load allocations in reasonable period of time. TMDL(s) and implementation measures are incorporated into the water quality management plan. Water quality management plan revisions are consistent with other existing provisions of the water quality management plan.		