

STATE WATER RESOURCES CONTROL BOARD

*Structure and Effectiveness
of the State's Water Quality Programs:
Section 303(d) of the Federal Clean Water Act and
Total Maximum Daily Loads (TMDLs)*

**Report to the Legislature
Pursuant to AB 982 of 1999**

JANUARY 2001

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EXECUTIVE SUMMARY

Assembly Bill (AB) 982 (Chapter 495, Statutes of 1999) requires the State Water Resources Control Board (SWRCB) to convene an advisory group or groups to assist in the evaluation of the structure and effectiveness of SWRCB's programs implementing Section 303(d) of the federal Clean Water Act (CWA). The law requires the SWRCB to report to the Legislature regarding the structure and effectiveness of these programs and to consider any recommendations of the advisory group or groups on or before November 30, 2000 and annually thereafter until November 30, 2002. AB 982 also requires the SWRCB to assess its current surface water quality monitoring programs and to propose a comprehensive surface water quality monitoring program for the State.

In February 2000, the SWRCB convened a 24-member AB 982 Public Advisory Group (PAG). Twelve of the PAG members represent the environmental community and the other 12 represent the regulated community. The PAG met frequently throughout the year to assist the SWRCB in the evaluation of related programs. The group presented its recommendations regarding the monitoring program to the SWRCB on October 4, 2000. Subsequently, the SWRCB prepared its report to the Legislature presenting a proposal for a comprehensive Surface Water Quality Ambient Monitoring Program (SWAMP) which is currently under review.

A significant amount of PAG's efforts focused on the evaluation of the structure and effectiveness of SWRCB's programs implementing federal CWA Section 303(d). Section 303(d) requires the State to develop a list of waters that are not attaining water quality standards and to develop discharge limitations on the amount of a pollutant that can be allowed without adversely affecting the beneficial uses of those waters. These limitations are referred to as Total Maximum Daily Loads (TMDLs). PAG members reviewed the SWRCB's current 303(d) listing and TMDL development processes and explored potential ways to enhance those programs. Members representing differing perspectives on the many complex issues worked diligently towards achieving consensus. While there are some issues that will require more time to resolve, the PAG reached consensus on many essential points. On November 16, 2000, PAG presented to the SWRCB those consensus points and its recommendations on how to improve 303(d) listing and TMDL processes. Those consensus points and recommendations are summarized on Page 2 and addressed in detail in Chapter IV of this report.

The SWRCB recognizes that its current 303(d) listing process can be improved. There has been a lack of consistency among Regional Water Quality Control Boards (RWQCBs) in developing the lists. Due to limited resources during the past 15-20 years, there has also been a lack of comprehensive monitoring efforts to obtain sufficient water quality data to determine actual impairment. Progress on TMDLs has been limited. Many factors have hindered the progress of TMDL development. One of those factors is the lack of resources. In fact, no funding was specifically dedicated to TMDL development until very recently. Federal funds dedicated to TMDL development first became available in Fiscal Year (FY) 1997-98 in the amount of \$800,000. That amount has since increased to the current federal contribution of \$3 million. California began to fund SWRCB/RWQCBs' TMDL efforts in FY 1999-00 in the amount of

\$3.9 million. State funding for the current fiscal year (FY 2000-01) is \$8.4 million. The increased resources have recently enabled the SWRCB and RWQCBs to begin to “ramp up” their effort to establish TMDLs.

Additional resources will be needed to support the implementation of the proposed SWAMP. This surface water quality monitoring program will provide comprehensive water quality data that will allow the SWRCB and RWQCBs to make more accurate determinations of impaired waters in future 303(d) listing processes. Moreover, as noted by the PAG, developing and implementing meaningful TMDLs is a significant challenge, and additional resources are necessary if substantial gains in improving water quality throughout the State are to be realized.

The development and implementation of TMDLs is a complex process. TMDLs require that all sources of pollution be evaluated and that allocations of allowable releases of pollutants be assigned to specific sources or categories of sources. TMDL development therefore requires a comprehensive look at the spatial and temporal nature of pollutants. Furthermore, to make TMDLs meaningful so that actual water quality improvements can be achieved, it is imperative that workable responses to the pollutant evaluations be developed. Implementing corrective actions requires an equally comprehensive look at implementation capabilities and a balancing of responsibility and capability. Another critical element is the involvement of interested parties and the public in an open process.

These elements of the TMDL development process cut across many established programs. Implementing the strategies and limits contained in TMDLs will require the coordination with many water quality programs, both inside and outside of the SWRCB. This need to weave together existing programs is what sets TMDLs apart from all other water quality programs.

This report is the first of three annual reports to the Legislature required by AB 982 on the structure and effectiveness of SWRCB’s 303(d) listing and TMDL programs. The report describes the current process of implementing these programs, identifies some critical areas in need of improvement, and proposes ideas for future discussions with the PAG on how we should measure our progress in this challenging effort. The discussion of PAG’s consensus points and recommendations are based on PAG’s draft report (Draft V) received by the SWRCB on December 22, 2000.

Need for Additional Resources

PAG agrees that there are inadequate resources for the State to fulfill its TMDL obligations, and recommends that the State dramatically increase its funding to support the Section 303(d) listing, TMDL development, and TMDL implementation activities at the SWRCB and RWQCBs.

Although the State and federal funding for TMDL efforts has been increased in the past two years, the SWRCB agrees with the PAG that additional resources will be necessary to fully implement Section 303(d) requirements. The SWRCB has projected a long-term staffing need of 200 Personnel Years (PYs) and \$10 million to \$15 million in contract funds annually to sustain the TMDL development and implementation effort. This level assumes an ongoing need to

support adaptive management, new listings, and TMDL revisions. However, these additional resources should be allocated at a manageable pace to allow the SWRCB/RWQCBs time to recruit and train staff.

Management of Public Participation, the Stakeholder Process, and Cross Media/Jurisdiction Issues

PAG members support involvement of stakeholders and the public in TMDL development and implementation planning processes, but the representatives from the regulated and the environmental communities disagree on the level or degree of stakeholder involvement. The PAG also suggests that the SWRCB/RWQCBs seek collaboration with other government agencies to ensure that cross-media sources of pollution are addressed in TMDL implementation.

It is critical that the SWRCB and RWQCBs ensure that all interested parties are involved in the TMDL process. Therefore, the SWRCB agrees that the process needs to involve the stakeholders and the public to the greatest extent feasible. While decisions must be pushed forward in our effort to develop timely TMDLs, in many instances taking the time to resolve issues early in the development process can accelerate the final TMDL and its implementation. The SWRCB will consider options for providing financial support to ensure adequate stakeholder participation and will continue to work with the PAG to develop appropriate approaches. In addition, the SWRCB fully agrees with the PAG that education and outreach is a crucial aspect of successful TMDL development and implementation. For instance, the SWRCB and RWQCBs will expand the use of the Internet as a communication tool to provide timely information on 303(d) listed impaired water bodies, TMDL schedules and pending actions, and Geographic Information System (GIS) shapefiles of listed water bodies. The SWRCB will work with the PAG to improve public accessibility to information developed by SWRCB and RWQCBs.

Cross media pollutant control is a complicated issue and the SWRCB and RWQCBs are making efforts to address it. The SWRCB/RWQCBs are working with the Air Management Districts and the Air Resources Board on problems resulting from aerial deposition of pollutants that cause pollution in storm water runoff and exceedance of water quality objectives. Also, under the leadership of the California Environmental Protection Agency (Cal/EPA), discussions are underway with the Department of Pesticide Regulation (DPR), Department of Forestry and Fire Protection, and other federal, State, and local agencies on cross-jurisdiction efforts to address environmental problems. Furthermore, pursuant to the Plan for California's Nonpoint Source Pollutant Control Program (NPS Plan) the SWRCB/RWQCBs are working with over 20 other State agencies to address nonpoint source problems.

Listing of Waters as Impaired

The PAG recommends that the SWRCB formally adopt a Policy to guide RWQCBs' 303(d) listing process.

The SWRCB agrees with the PAG that statewide listing guidance is necessary to ensure consistency among all RWQCBs in their efforts to list the impaired waters. SWRCB staff will

develop a Policy that will direct the listing process for listings after 2002. SWRCB adoption of a formal 303(d) listing policy will require a rulemaking process and will require substantial time and public participation to complete.

TMDL Development

The PAG suggests that:

- TMDLs should be established and implemented in accordance with the CWA and where applicable, the Porter-Cologne Water Quality Control Act (Porter-Cologne Act) and other relevant State and federal laws.
- Science should play a role in TMDL development. (However, the regulated and environmental communities disagree in details regarding the level of scientific information that is necessary for TMDL development.)
- SWRCB/RWQCBs should explore ways to assist in completing TMDLs more quickly, including training, the establishment of “strike forces” at SWRCB, utilizing staff from other agencies, beginning some difficult TMDLs early, and grouping related pollutants to expedite TMDL technical work.
- Wasteload or load allocations should be established for sources of legacy pollutants and the SWRCB and RWQCBs should aggressively use existing legal authorities to identify the responsible parties for the legacy pollutants.

The SWRCB/RWQCBs are developing, in most cases, TMDLs with programs of implementation clearly articulated and establishing them as formal Regional Water Quality Control Plan (Basin Plan) amendments in accordance with both the CWA and the Porter-Cologne Act. This formal process requires a substantial investment of time and resources but substantially enhances successful implementation of the TMDLs.

The SWRCB recognizes that scientific and technical information is the foundation of TMDLs. The level of information required for an adequate understanding of each specific pollutant being addressed in a TMDL varies, depending on the complexity of watershed activities and pollutant dynamics. The SWRCB will continue to work with the PAG to address the appropriate level of scientific information necessary for developing TMDLs.

Current actions taken by the SWRCB to assist in the development of TMDLs include forming a TMDL Team to support and provide assistance to the RWQCBs and sponsoring various types of TMDL training, including modeling, statistical analysis, and U.S. Environmental Protection Agency (USEPA) workshops. Representatives of SWRCB/RWQCBs and cooperating agencies have formed workgroups to share information on TMDL development and to work together to develop TMDLs for pollutants that are statewide concerns. Contract funds are being used to fill many of the information gathering needs required for TMDL development.

Legacy pollutants pose unique problems in TMDL development because they often are not associated with a currently identifiable party or parties, and the search for responsible

parties can be a lengthy and resource intensive undertaking. In cases where a clear connection can be made to an entity or entities responsible for the pollutants, the RWQCBs will take all actions within their authority to hold such entities accountable.

TMDL Implementation Plans and Implementation

PAG agrees that the Implementation Plan:

- Is an essential part of the TMDL process.
- Should require stakeholder involvement in the implementation of the Plan.
- May include interim milestones for load reductions.
- Should identify specific controls and/or management actions for all sources of pollutants consistent with the CWA and Porter-Cologne Act.
- Should consider use of Supplemental Environmental Projects (SEPs).

The SWRCB agrees with the PAG that implementing corrective actions is the key activity that will make TMDLs successful and that stakeholder involvement in the process is critical to sustained success. Further, the SWRCB recognizes that interim milestones may be necessary in some TMDLs that rely on the adaptive management approach to refine the TMDL over time in order to address specific controls on all identifiable pollutant sources.

SEPs are projects that receive support from fines imposed as part of the RWQCB's enforcement actions. The use of SEPs is actively being discussed at the SWRCB and RWQCBs to address a number of water quality issues. The SWRCB is currently considering amendments to the Water Quality Enforcement Policy that will provide consistency among RWQCB enforcement actions, including acceptable uses and conditions for using fine money to support SEPs and TMDL efforts. SWRCB staff will continue to discuss with the PAG possible ways to use SEPs to assist in TMDL development and implementation.

In the coming year, we will need to continue to develop TMDLs expeditiously. We also need to revise the 303(d) list in 2002 and in subsequent years. There are many areas in the current process where we can target our improvement efforts. The most pressing areas needing improvement are in communication and engagement of stakeholders and the public. Secondly, we need to ensure that new staff are recruited, trained, and provided with the appropriate skills to develop TMDLs. Technical issues of water quality assessment and analytical approaches to developing allocations and total loads will continue to be important areas for attention, particularly the application of modeling techniques for assessment, allocations, and implementation planning.

The SWRCB will continue to work with the PAG on these issues and to identify ways to enhance the 303(d) listing and TMDL processes. Discussions on those issues will be included in the succeeding two annual reports on the structure and effectiveness of SWRCB's programs implementing CWA Section 303(d). Topics for future discussions with the PAG will also include offset programs, use of SEPs to fund TMDL development, legacy pollutants, ways to advance timely development of TMDLs, and other issues that may arise in the next two years when more TMDLs are developed and implemented.

I. INTRODUCTION

The federal CWA contains strategies for managing water quality. The first is a technology-based approach that requires development of performance standards for pollution control technology for point source discharges under the National Pollutant Discharge Elimination System (NPDES) Program. This was the great innovation of the 1972 CWA. The second companion strategy is a water quality-based approach that relies on evaluating the condition of surface waters and setting limitations on the amount of a pollutant the water can assimilate without violating water quality standards. This approach applies to both point and nonpoint discharges. Section 303(d) of the CWA bridges these strategies. Section 303(d) requires that the states produce a list of waters that are not attaining standards after the technology-based limits are put into place. For those waters included in the 303(d) list and where the USEPA administrator deems appropriate, the states are required to develop TMDLs. A TMDL must account for all sources of a pollutant that caused the water to be listed. Federal regulations implementing Section 303(d) require that the TMDL, at a minimum, account for contributions from point sources and nonpoint sources, such as polluted runoff. USEPA is required to review and approve the list of impaired waters and each TMDL developed by the states. If USEPA disapproves a list or a TMDL, it is required to establish them for the State. The text of CWA Section 303(d) is attached as Appendix B.

For the 25 years between the enactment of Section 303(d) in 1972 and 1997, the major regulatory emphasis was on technology-based permits, although many water quality-based efforts were undertaken in California. However, the two strategies remained largely separate from one another because little work was undertaken explicitly to comply with Section 303(d) requirements due to the lack of resources. Beginning in the late 1980s, environmental groups across the country began to bring suits to ensure that the listing of impaired waters and development of TMDLs would take place. As a result of this litigation pressure, USEPA, Region 9, began to provide grant funds in 1997 for TMDL development in California. Two years later, in 1999, the State provided its first funding dedicated to TMDL development.

The TMDL debate mobilized a coalition of environmental groups, businesses, local governments, and the NPDES permit holders in California. Also keenly interested are agricultural interests, including forestry businesses and other land use managers and owners. In 1999, the Legislature enacted AB 982, which required the SWRCB to convene an advisory group or groups to assist in the evaluation of program structure and effectiveness as it relates to the implementation of the requirements of CWA Section 303(d) and applicable federal regulations. The advisory group(s) were to be comprised of persons concerned with the requirements of Section 303(d). The SWRCB must report to the Legislature annually for three years on the structure and effectiveness of its water quality programs related to Section 303(d). In formulating the report, the SWRCB is required to consider recommendations of the advisory

group(s). AB 982 also requires the SWRCB to assess its current surface water quality monitoring programs and to propose a comprehensive surface water quality monitoring program for the State.

The SWRCB convened the 24-member PAG in February 2000. Half of the PAG membership represents various environmental groups throughout the State, and the other half represents the public and private entities whose activities are regulated by the SWRCB and RWQCBs, including cities and counties, sanitation districts, the oil industry, the agriculture and timber industry, and the building industry. A complete list of AB 982 PAG members is presented as Appendix A of this report. The PAG held frequent meetings to discuss SWRCB's monitoring programs and to evaluate SWRCB's programs implementing the requirements of CWA Section 303(d)—primarily the processes of listing impaired waters and developing and implementing TMDLs.

The PAG presented its recommendations regarding the monitoring program to the SWRCB on October 4, 2000. Subsequently, the SWRCB prepared a report to the Legislature proposing the Comprehensive Surface Water Quality Ambient Monitoring Program (SWAMP), which is currently under review. On November 16, 2000, PAG presented to the SWRCB its consensus points and recommendations on how to improve SWRCB's and RWQCBs' 303(d) listing and TMDL processes. Those consensus points and recommendations are discussed in Chapter IV of this report.

This report is the first of three annual reports to the Legislature required by AB 982 on the structure and effectiveness of SWRCB's 303(d) listing and TMDL programs. The report describes the current process of implementing these programs, identifies some critical areas in need of improvement, and proposes ideas for future discussions with the PAG on how we should measure our progress in this challenging effort.

The report is presented in five major sections. Chapter II describes SWRCB's approaches to achieving water quality standards. Chapter III describes the current structure of the SWRCB's and RWQCBs' 303(d) listing and TMDL processes. Chapter IV is a discussion of the issues raised by the AB 982 PAG, along with its consensus points and recommendations. Chapter V proposes criteria for future evaluation of the effectiveness of the SWRCB/RWQCBs' listing and TMDL processes. These criteria are included to begin a dialogue on ways to measure program effectiveness in the future and to identify the types of resources necessary to conduct the evaluation. Chapter VI identifies key areas that the SWRCB has targeted for an increased level of effort in the coming year.

II. CALIFORNIA'S WATER QUALITY EFFORTS

The federal CWA contains strategies for assuring that surface water quality is maintained. The first strategy requires that performance standards for pollution control technology be developed and applied to industrial and municipal point source discharges under the NPDES Program. The companion strategy is a water quality-based approach that relies on evaluating the condition of surface waters to determine if they are capable of supporting the beneficial uses of the water. The water quality-based approach generally involves the establishment of receiving water objectives to protect beneficial uses. These objectives may then be used to establish effluent limits for point source discharges and/or load allocation or targets for nonpoint source discharges. Nonpoint source discharges are managed in accordance with the NPS Plan.

Technology-Based Approach

The technology-based approach initiated in 1972 came with substantial federal grant money to build wastewater treatment plants. The CWA established the NPDES permit program as the mechanism to assign performance standards to individual facilities. California's NPDES permit system is administered by the SWRCB and RWQCBs and now encompasses nearly 2,300 facility permits statewide, approximately 50 general permits and four types of storm water permits.

Water Quality-Based Approach

Under the water quality-based approach, water quality objectives are established at levels that protect the beneficial uses. Basin Plans are developed by the nine RWQCBs, and statewide plans and policies, such as the California Ocean Plan and the Policy for Implementation of Toxic Standards for Inland Surface Waters, Enclosed Bays and Estuaries of California, are developed by the SWRCB. These plans/policies serve as a repository for the standards and establish implementation plans for achieving standards that require more than implementing the technology-based approach. In addition to the wastewater treatment technologies, the Basin Plans also require other activities, such as Best Management Practices (BMPs), to address problems caused by polluted runoff and other nonpoint source discharges. TMDLs are required when technology-based methods are insufficient to achieve water quality-based standards.

Since the enactment of the CWA in 1972, California has maintained a water quality-based approach to water management. This approach produced pollutant-based water quality control strategies that were similar to the federal TMDL model. Examples of water quality-based efforts include, but are not limited to, the rice herbicide control program in the Sacramento Valley Region; the South San Francisco Bay copper and nickel control program; the Laguna de Santa Rosa TMDL; the Stemple Creek and Garcia River watershed strategies in the North Coast Region; the Morro Bay and Chorro Creek sediment management efforts in the Central Coast Region; the Malibu Creek nutrient management

efforts in the Los Angeles Region; sediment control in Newport Bay; Eliso and San Juan Creek management plans in the San Diego Region; sediment control in the Salton Sea drainage, and erosion control management around Lake Tahoe.

Watershed Management

Historically, the SWRCB's water quality management strategy has functioned on a regional, programmatic basis. This has worked reasonably well for controlling conventional pollutants from point sources, such as publicly owned treatment works (POTWs) but has not proven adequate to address nonpoint sources of pollution. A significant portion of current water quality impairments is caused by nonpoint source pollution. Unlike point source pollution that can be controlled by treatment facilities, it would be very costly, or in many cases unfeasible, to capture the flows of polluted runoff and treat them. Nonpoint source pollution is the result of practices and uses of lands surrounding water bodies; however, the SWRCB and RWQCBs do not have authority to regulate land uses or practices. Therefore, approaches to control nonpoint source pollution involve land use planning, facilities management, application of BMPs, public education, and the involvement of other agencies and authorities at all levels of government. The overall approach is to develop site-specific watershed based management plans that seek to integrate management across all uses of the water in a given local watershed. This approach is referred to as the Watershed Management Initiative (WMI) that is implemented pursuant to the SWRCB's 1995 Strategic Plan. TMDLs often form the impetus for developing these watershed management plans.

Watershed management is an integrated planning approach that coordinates existing efforts to regulate point source problems with new efforts to address nonpoint source pollution. In the watershed management approach, water resource problems are identified and prioritized primarily on the basis of water quality within individual watersheds. Unique solutions that consider all local conditions and pollution sources are developed for each watershed with the input and involvement of local stakeholders.

The watershed management approach acknowledges that:

- Impairments arise from the varied and multiple effects of land management (primarily nonpoint source) and discrete discharges of pollution (primarily point source).
- **To minimize impairment requires:**
 - A good knowledge of watershed conditions,
 - A collaborative response by land owners and managers, and
 - Effective pollution control capabilities.
- Managing watersheds requires extensive public outreach and involvement.
- Local needs and capabilities are merged with state and national interests.
- Responsibility is distributed among all parties.
- Water quality improvement and restoration of beneficial uses determines success.

An Integrated Approach to TMDL Development and Implementation

The CWA requirements for TMDLs seek to develop management targets and limitations on the amount of individual pollutants that can be present in any listed water body. The CWA does not expressly require the implementation of TMDLs except for point source discharges. Section 303(d), 303(e), and their implementing regulations require that approved TMDLs be incorporated into water quality control plans. The USEPA has established regulations (40 CFR 122) requiring that NPDES permits be revised to be consistent with any approved TMDL. A new federal regulation, established in August 2000 and scheduled to become effective in October 2001, requires that implementation plans be developed along with the TMDLs.

In California, the Porter-Cologne Act (California Water Code Section 13000 et. seq.) requires each RWQCB to formulate and adopt water quality control plans for all areas within the State. It also requires that a program of implementation be developed that describes how water quality standards will be attained. When the TMDL is established and incorporated into the Basin Plan, an implementation program must be designed. TMDLs and implementation plans are then incorporated into the respective Basin Plans and codified in State regulation under CCR Title 23.

Therefore, TMDLs in California take on a broader scope as State regulations than what is minimally required by federal law. Only by coupling the federal TMDL requirements with State authority for implementation planning and oversight can meaningful progress in improving water quality be achieved using TMDLs when nonpoint source pollution is a significant cause of impairment. Together the State and federal laws require a comprehensive planning and water quality control effort designed to fully protect beneficial uses of water.

III. THE STATE'S CURRENT TMDL PROCESS

CWA Section 303(d) requires the states to compile a list of waters that do not, or are not expected to, attain standards after technology-based limits are put in place for all point sources discharging to the subject waters. The States must assign priorities to the listed waters, as well as establish TMDLs for each identified pollutant. TMDLs must establish the amount of the pollutant(s) causing the impairment that the water body can receive and still attain water quality standards. This allocation of pollutant must take into account seasonal variations and lack of certainty concerning the relationship between effluent limits for point source discharges and water quality. Section 303(d) thus serves a planning function that describes a quantitative, measurable feature of the water body that can be used to determine attainment of the applicable standard. As a consequence, TMDLs serve as a water quality-based strategy. TMDLs are not, by legal definition, water quality standards. The states, however, could construct a standard that serves as a TMDL. USEPA must review and approve or reject each TMDL. If USEPA rejects a TMDL it must establish the TMDL for the subject water body.

The significant feature of TMDLs is that they provide one or more measurable features of water quality that will define progress towards attainment of standards. There has not been a systematic attempt to provide this clarity to manage ambient water quality. Previously, emphasis was placed on controlling individual point source discharges. It was assumed that sufficiently rigorous regulation of specific discharges would protect water quality. With increasing control over point sources and the intensification of land use and expansion of nonpoint source pollution, it is proven that such an assumption is false. The TMDL process requires a broad analysis of pollutant management. Through the TMDL process, the allowable amount of pollutant discharge is allocated to both point sources (wasteload allocation) and nonpoint sources (load allocation).

The lists of impaired waters compiled by the State in the past include a wide variety of problems that range from a single known pollutant on a small discrete water body (e.g., McGrath Beach for bacterial indicators) to general or unidentified pollution problems throughout entire river basins (e.g., Klamath River for sediment). This makes it difficult to create a standardized approach or unit cost for TMDLs. The scientific and socio-political context of TMDLs varies widely from problem area to problem area. The need to engage the local community is different in different settings. The tools, resources, and approaches that are effective in urban settings are different from those in rural settings. What has been standardized to a degree are the elements of a TMDL (see Appendix D) and the basic conceptual approach toward developing the elements.

303(d) Listing of Impaired Waters

The listing of impaired waters pursuant to Section 303(d) has evolved over time. Initially, in 1976, fewer than 20 water bodies were identified in the 305(b) report as “Water Quality Limited Segments.” The “Water Quality Limited Segments” list remained virtually the same until 1988, when it increased to 75 water bodies. In the 1990 305(b) report, the list was identified for the first time as the “Section 303(d) List.” The 1990 303(d) list included

approximately 250 water bodies. Since 1990, the 303(d) list has increased with each biennial listing process, and in 1998, 509 water bodies were listed with 1,471 water body reaches and pollutants reflecting combinations of quality problems.

Prior to 1998, the listing process varied among RWQCBs. Some RWQCBs formally adopted the 303(d) list for their regions, while others did not. In 1998, staff at all nine RWQCBs presented their 303(d) list to their respective boards for official approval. All RWQCBs but San Francisco RWQCB adopted their lists by resolution. The SWRCB also formally approved the 1998 statewide 303(d) list before submittal to USEPA. Appendix C provides additional details of the 1998 listing process. Federal law requires that the list be revised every two years; however, a federal rule (February 2000) suspended the 2000 submittal. The next revision of the list is due in April of 2002 to USEPA.

SWRCB staff will develop a policy for the adoption by the SWRCB that will direct the listing process. This policy will contain detailed data quality requirements, solicitation of information from the public, and prioritization of TMDLs.

Litigation

Litigation over Section 303(d) started in the late 1980s. By the mid-1990s, over 25 lawsuits had been filed nationwide against USEPA. These suits focused on the failure of states to develop the required list of impaired waters and the failure to develop TMDLs for those waters. This litigation pressure is largely responsible for the current interest in and support for increased efforts to develop and implement TMDLs.

Three lawsuits in California have resulted in settlement agreements between USEPA and the plaintiffs (environmental groups). Each agreement contains a schedule for the completion of specified TMDLs. The State, however, is not a party to these settlements. The settlement parties have agreed to allow the State to attempt to establish the named TMDLs according to the specified schedules. If the State is unable to complete the TMDLs in the time allotted, then USEPA is required to establish them. The TMDLs required by these settlement agreements do not include any implementation features. However, under California law, if the State establishes the TMDLs, implementation must be included. The timelines in the settlement agreements, coupled with the obligation to develop implementation measures among other requirements established by State law, have made it difficult for the RWQCBs to conform to the settlement schedules. These settlement schedules include 39 TMDLs for north coast rivers to be completed in a ten-year period, 750 TMDLs in the Los Angeles Region to be completed within a 13-year period, and six TMDLs in the Santa Ana Region to be completed within a five-year period.

A consequence of the litigation is the focus on developing “technical TMDLs.” The term “technical TMDL” was used to separate the minimum requirements of the Section 303(d), i.e., the technical analysis leading to the measurable features, from the larger TMDL process that includes implementation planning and support for watershed management. Because most of the implementation authority resides in State law and watershed management is essentially a policy decision by the SWRCB and RWQCBs rather than a regulatory requirement, the lawsuits brought against USEPA cannot address those issues. Consequently, the litigation tends to

fracture the TMDL process and stress the documentation of numbers. Federal grant management has responded to this pressure by focusing resources on the technical TMDLs. As a result, a significant portion of the State TMDL funds has been expended on reattaching the technical TMDLs to the complete TMDL process, including implementation.

Defining a Complete TMDL

The State and USEPA have defined a complete TMDL differently. The State considers a TMDL to be complete when the Basin Plan amendment (including an implementation plan) is approved by the Office of Administrative Law (OAL) and by USEPA. USEPA considers a TMDL to be final once USEPA has acted on a “technical TMDL” report or Basin Plan amendment submission. A “technical TMDL report” addresses only the derivation of the numeric limitations, i.e., total load, wasteload, and load allocations. It is not required to include implementation provisions. USEPA can establish the TMDL based on technical reports without programs of implementation, e.g., Garcia River TMDL developed by USEPA. To establish the TMDL, USEPA must provide public notice of its action and a comment period and then develop a responsiveness summary that is included with the final action. No public hearings are required in this process. To approve a Basin Plan amendment, USEPA must notify the State of its approval and, in cases where its approval relies on a change in federal regulation, it must provide a federal register notice of the action.

In contrast, when the State develops the TMDL, it is typically codified into State regulations through the Basin Plan amendment process. The TMDL may take the form of a water quality standard with an associated revision to the program of implementation, or it may be developed as a revision to the program of implementation. In either case, a state-adopted TMDL must consider the means by which any numeric target or limitation contained within the TMDL will be attained.

Significantly, Section 303(d) does not include language regarding implementation. In general, USEPA can ensure some degree of implementation through its oversight of the NPDES program. Other aspects of implementation are left up to the states to define and carry out. For instance, most of the impaired waters in California are the result of nonpoint source pollution for which USEPA has limited authority. California water quality laws, however, provide the SWRCB/RWQCBs with authority to address nonpoint source problems. USEPA has taken some steps to promote the implementation of the pollution limits defined in TMDLs. USEPA has defined in regulation the need to make allocations to both point sources and nonpoint sources. It further requires that issuance or revisions of NPDES permits must be consistent with established TMDLs. The new pending regulations contain additional provisions regarding implementation. CWA Section 303(e) requires, in part, that TMDLs be incorporated into each state’s water quality control plan. In California, this is accomplished by incorporating the TMDLs in Basin Plans. Basin Plans are the primary instrument for water quality regulation in California.

The SWRCB has recognized for some time the fact that merely establishing a numeric load/wasteload allocation in a TMDL carries little practical meaning towards addressing a water quality problem. A substantive strategy must include the means by which action will be achieved to address the problem. The SWRCB has identified watershed management efforts as

the best means to ensure that an infrastructure is present to sustain implementation of the TMDLs. This includes the cultivation of the institutional structure to allow TMDLs to succeed in directing water quality management that goes beyond establishing numeric limitations only. This is a fundamental difference in the State and federal approaches and interpretation of a complete TMDL.

TMDL Resources: Staff and Contract Support

Before 1997, TMDLs were developed only to the extent that funding from various programs could be used to develop aspects of the TMDLs. No single program provided the necessary authority to allow a TMDL to be fully supported with a single fund source. For example, work on the San Lorenzo River nutrient problems was conducted using basin planning funds and Nonpoint Source Program funds (federal grants under CWA Section 319). However, these funding sources were not available to support monitoring and assessment that were needed to complete the TMDL, and therefore the time associated with TMDL development during this period was quite long. In FY 1997-98, USEPA redirected \$800,000 in CWA Section 104 grant funds to provide the first funding dedicated to TMDL development in California. USEPA expanded this support in FY 1998-99 to \$1.5 million in combined Section 104 and Section 106 grants. These are federal grants to states to fund pollution control programs. Beginning in FY 1998-99, USEPA capped the allotment to any single TMDL at \$125,000. In FY 1999-00, USEPA added additional grant support by targeting \$1.5 million in Section 319 grants toward TMDL development, and maintaining the \$1.5 million in combined Sections 104/106 funding for a total grant support of \$3 million for TMDLs, which supports 28.5 Personnel Years (PYs). Federal support for the TMDL maintains at \$3 million level in FY 2000-01.

In FY 1999-00, the first dedicated State funds provided \$3.923 million in TMDL support for the SWRCB. The DPR also received \$2.13 million for TMDL-related work. The SWRCB allocation consisted 31.5 PYs and \$1.6 million for contracts.

The Governor's Budget for FY 2000-01 increased the SWRCB baseline budget by \$2.97 million and 21 PYs for implementation of established TMDLs and monitoring and assessment activities related to TMDL implementation. These budget increases do not include additional funds for TMDL development. The Legislature augmented SWRCB's FY 2000-01 budget by \$4.5 million and 34.5 PYs specifically for TMDL development. DPR also received an additional \$1 million and 7.6 PYs in the Governor's Budget and \$500,000 and 0.9 PY in a legislative augmentation for TMDL-related activities.

All State funds are General Fund allocations. The RWQCBs develop workplans specifying tasks to be performed, using the combined State and federal funds available for each fiscal year. The federal funds have a cap of \$125,000 per TMDL imposed by USEPA without regard to fiscal year. The SWRCB Division of Water Quality maintains a TMDL Team that consists of staff working on TMDL and other programs. The Team assists the RWQCBs in TMDL development and tracks progress and expenditures on TMDLs. Expenditures are tracked by individual TMDL and by each of the four fund sources (three federal grants and the General fund).

Table 1 provides a history of TMDL resource allocations and total projected annual needs.

Table 1

TMDL Development Ramping Rates Total State and Federal Funded Staffing and Contracts by Year FY 1997-98 through FY 2000-01 and Total Need Estimation					
	FY1997-98	FY1998-99	FY1999-00	FY2000-01*	<i>Anticipated Total Annual Need**</i>
Staff (PYs)					<i>200</i>
Federal	5.5	11.7	28.5	28.5	
State	0	0	31.5	66.0	
Total Staff	5.5	11.7	60.0	94.5	200
Contracts					<i>\$20,000,000</i>
Federal	\$309,000	\$299,500	0	0	
State	0	0	\$1,650,000	\$2,650,000	
Total Contracts	\$309,000	\$299,500	\$1,650,000	\$2,650,000	\$20,000,000
Total Support	\$800,000	\$1,500,000	\$6,923,000	\$11,423,000	\$40,000,000

* The total of State PYs does not include the 21 PYs for TMDL implementation.

** This anticipated need is based on the total number of TMDLs that need to be developed. Once established, TMDLs will require continuous revision and implementation oversight. These 200 PYs will be needed to address ongoing workload.

The FY 2000-01 legislative augmentation has been programmed into the current year workplans. The WMI planning process provides a description of the most pressing needs above current funding levels. When augmentations are provided, the resources are dedicated to the priorities identified in the WMI planning schedules and adjusted for any opportunities or constraints that may have arisen since the planning schedule was drafted.

Coordination of RWQCB Efforts

To date, the SWRCB has not established a formal policy to direct the RWQCBs on how to pursue TMDL development. Currently, the RWQCBs have the flexibility to craft solutions that take advantage of available resources and expertise, that respond to the stated needs of interested parties, and that provide for protection of the unique characteristics of the local conditions. To ensure statewide consistency and fair and open processes, the SWRCB has established a TMDL Roundtable comprised of SWRCB, RWQCB, and USEPA staff. The Roundtable meets quarterly and shares information on program management and technical approaches to TMDL

development. Together with USEPA, the SWRCB is also providing regular training opportunities to ensure staff is kept abreast of the most current approaches to TMDL development.

The TMDL Team at SWRCB assures the maximum integration of program functions into the TMDL process and helps program staff understand key TMDL issues. TMDL units and teams have also been formed at RWQCBs. Where specific program expertise is needed, other program staff is generally made available to assist in the TMDL development.

Contract services are also being used to assist in coordination and TMDL development. All RWQCBs are actively using contracts to augment the stakeholder public discussions, to provide technical analysis, to model TMDL parameters or targets, and to provide training in TMDL development. Contracts for statewide training services are under development and have been used in the past.

New Federal TMDL Rule

On July 13, 2000, the USEPA issued a Final Rule to revise the national TMDL program. The new Rule:

- Contains new provisions for conducting the process for listing impaired waters;
- Provides for subdivisions of the 303(d) list and makes a distinction between non-attainment of water quality standards caused by pollution (i.e., where habitat modification has resulted in beneficial use impairment) and non-attainment caused by known pollutants;
- Provides new definitions for TMDLs;
- Requires implementation plans;
- Requires reasonable assurances that finances are available to implement nonpoint source controls identified in the implementation plans;
- Requires that the 303(d) list be amended into Basin Plans; and
- Requires demonstration of attainment of water quality standards for the removal of waters from the 303(d) list.

These new requirements will substantially increase the workload associated with establishing TMDLs. The new Rule will be effective in October 2001. The specific impact of the new Rule on the SWRCB's and RWQCBs' current TMDL process cannot be determined at this time.

TMDL Costs and Projected Need

The SWRCB has projected a long-term staffing need of 200 PYs and \$10 million to \$15 million in contract funds to sustain the TMDL development and implementation effort by the SWRCB and RWQCBs. This level assumes an ongoing need to support adaptive management, new listings, and TMDL revisions. The costs of conforming to the new Rule are not accounted for in this projected need. The SWRCB has not estimated the stakeholders' costs of TMDL implementation. At this point, implementation costs are too speculative to provide a meaningful

estimate. The State has not completed enough TMDLs to characterize “typical implementation needs.” The costs of TMDL development and implementation are expected to be spread across participating entities. The bulk of the TMDL development costs will fall to the SWRCB and RWQCBs, but implementation costs will fall largely on the private sector and local government. Proposition 13 funds could contribute to supporting local government and the private sector for TMDL implementation. Additional sources may include U.S. Department of Agriculture cost share programs, various program funding in State and federal agencies, and future bond funds.

Currently, the SWRCB estimates the development cost of an average TMDL to be approximately \$600,000. This cost may be reduced over time as the TMDL effort becomes more efficient. These costs do not take into consideration the effect of the new TMDL Rule. Many of the tasks and products required by the new federal Rule would require USEPA approval. Until the SWRCB and RWQCBs have an opportunity to work through these approval processes, the costs of these new requirements cannot be determined.

Basin Plan Amendment Process

The SWRCB has a formal process for amending Basin Plans that is established in accordance with State statutes and regulations and with SWRCB policy. This process provides for:

- Public notice of RWQCB hearings and a comment period;
- A formal hearing with comments received and formal response to comments included as part of the record;
- Adoption by the RWQCB;
- Review and approval or remand by the SWRCB;
- Review and approval by the OAL; and
- Review and approval of certain types (e.g., standards actions) of the amendments by USEPA.

Schedules for adoption of TMDLs into Basin Plans have been developed as part of the WMI planning process. These schedules are considered planning schedules rather than firm commitments for RWQCB actions. Past experience indicates that considerable public comment is involved in the formal adoption of the Basin Plan amendments. It is not clear whether the stakeholder processes being conducted as part of the TMDL development will reduce the public comment during the amendment process.

All TMDLs adopted by RWQCBs to date include provisions for monitoring of specific watershed elements that may affect the long-term implementation of the TMDL. They also include monitoring for track progress of water quality improvements moving towards the TMDL goals. Most TMDLs will require at least one mid-course correction as more information becomes available. Such a correction would need to be processed as a second Basin Plan amendment that adjusts the initial TMDL work.

USEPA, acting pursuant to court supervised consent decrees, has established some TMDLs independent of RWQCB Basin Plan amendment actions. This has occurred for the North Coast RWQCB and the Santa Ana RWQCB. It is also anticipated for the Los Angeles RWQCB. Once TMDLs have been established by USEPA, the State must incorporate them into

Basin Plans. In this process, RWQCBs must establish implementation provisions to accompany the TMDL. In general, shortly after USEPA has established a TMDL under the consent decrees, the RWQCBs have acted to adopt their own TMDL for the same water body/pollutant combination. When USEPA approves these TMDLs, they supersede the USEPA-adopted TMDL for the same water body and pollutant. Recently in the North Coast RWQCB, USEPA has established TMDLs that the RWQCB is not intending to take up in the near future as Basin Plan amendments. The available RWQCB staff is dedicated to developing technical TMDLs to adhere to the consent decree schedule.

TMDL Work Currently Underway

Technical issues and the number of pollutants and water body segments that can be combined will determine the exact number of TMDLs that will be necessary to address the State’s water quality problems. In some cases, multiple pollutants and water bodies can be addressed in a single TMDL. Based on the current 1998 303(d) list with over 1,400 water body/pollutant combinations, the SWRCB estimates that the total number of TMDLs needed is approximately 800.

The RWQCBs are currently engaged in developing over 120 TMDLs, many addressing multiple pollutants (Appendix E). The current 303(d) list contains a schedule for completing most of the required TMDLs over a 13-year period. More detailed schedules of work to be undertaken in the immediate three- and five-year periods have also been developed. The timeframe for TMDL development generally ranges from two to four years. Adoption of the TMDL as a Basin Plan Amendment requires approximately eight months.

TMDLs for the following water bodies and pollutants have been completed and adopted into Basin Plans:

Water Body

Pollutant

Laguna de Santa Rosa	nitrate
Newport Bay/San Diego Creek	nitrogen
Newport Bay/San Diego Creek	phosphorus
Newport Bay/San Diego Creek	sediment
Newport Bay/San Diego Creek	fecal coliform
Santa Ana River	nutrients
Salt Slough	selenium
Grasslands	selenium
Upper San Gabriel River	trash

The following TMDLs have been prepared by RWQCB staff, adopted by the respective RWQCBs, and are pending approval by one or more approving authorities:

<u>Water Body</u>	<u>Pollutant</u>
Garcia River	sediment
San Lorenzo River	nitrate

The following TMDLs have been publicly noticed for RWQCB consideration:

<u>Water Body</u>	<u>Pollutant</u>
Indian Creek	phosphorus
Heavenly Valley Creek	sediment
Calleguas Creek	chloride
Los Angeles River	trash
Santa Clarita and Santa Paula Rivers	chloride (standard action only)

USEPA has established the following TMDLs in accordance with consent decrees resulting from a lawsuit:

<u>Water Body</u>	<u>Pollutant</u>
South Fork Eel River	sediment, temperature
Noyo River	sediment
Van Duzen River/Yager Creek	sediment
South Fork Trinity River/Hayfork Creek	sediment
Redwood Creek	sediment
Garcia River	sediment
Newport Bay/San Diego Creek	sediment
Newport Bay/San Diego Creek	nutrients

The Garcia River and Newport Bay TMDLs have been adopted as Basin Plan amendments by the RWQCBs. USEPA has approved the RWQCB Newport Bay TMDLs, which now supercede the USEPA established TMDLs. The Garcia River TMDL is still in the USEPA review process. The other TMDLs listed above do not have RWQCB-adopted versions.

USEPA is in the process of developing TMDLs for Ten Mile River and Navarro River for sediment, pursuant to a consent decree.

Programs Implementing TMDLs and Interim Permit Limits

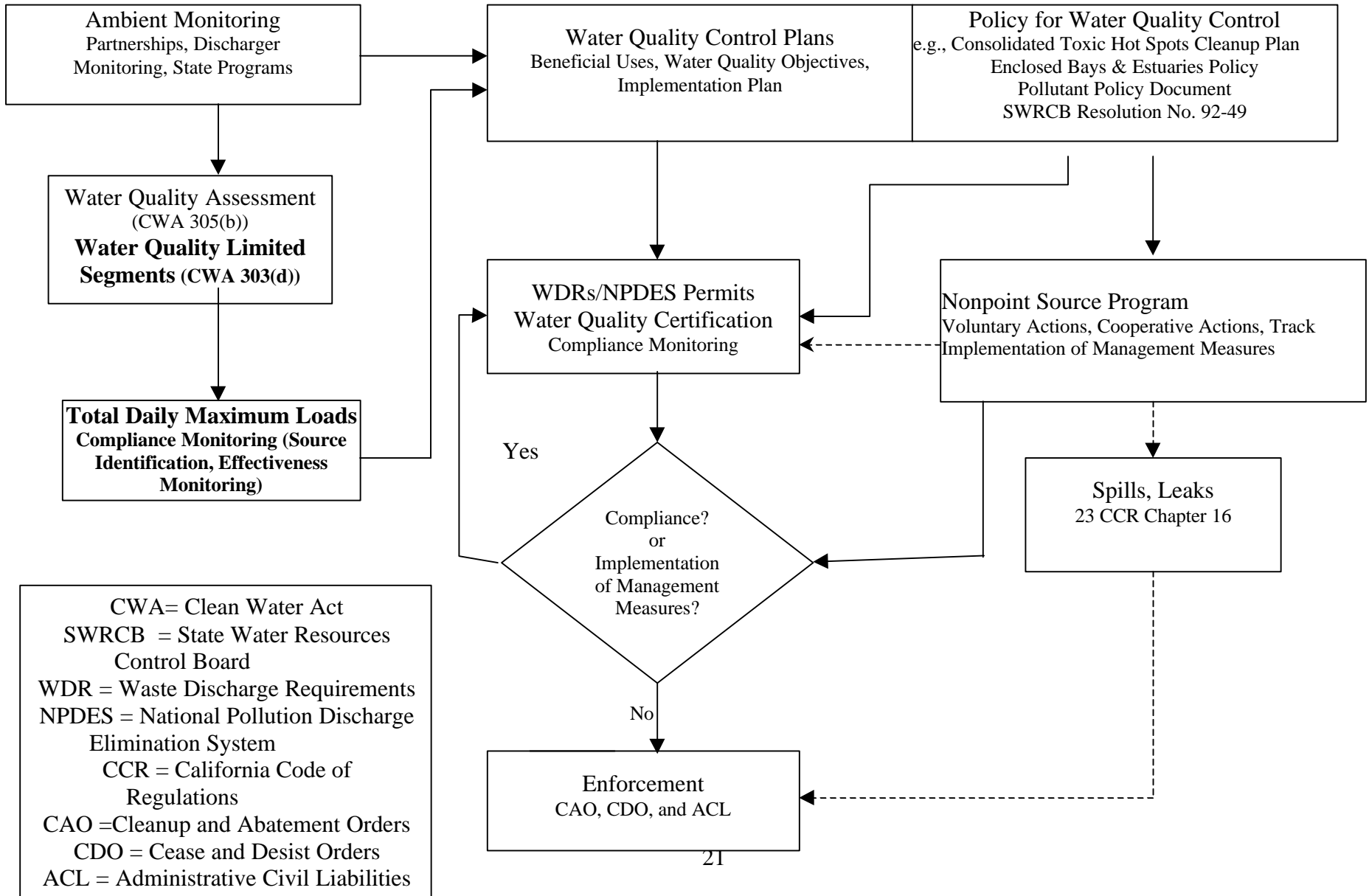
Once a TMDL is established, the implementation of the TMDL is carried out under the auspices of various programs. Figure 1 illustrates the relationships among those programs. Principal among them are the NPDES permit program and the Nonpoint Source Program.

The NPDES storm water program is considered a key mechanism to enforce the provisions of TMDLs affecting urban areas. Significant emphasis is also being placed on NPDES-permitted facilities. USEPA regulations require any effluent limitation contained in an NPDES permit to be consistent with the limitation established in TMDLs. The controls and responsibilities provided for permitting NPDES facilities require heightened attention when renewing permits for discharges into 303(d) listed waters even in the absence of a TMDL. Recently, permits adopted by an RWQCB for oil refineries that discharge into 303(d) listed waters have been challenged on the basis that the structure of the effluent limit provisions are inappropriate. USEPA has previously stated a position that would impose interim restrictions on current discharges while the TMDL is being developed. It also requires the inclusion in the permits the intention to impose final limits that prohibit the discharge of bioaccumulative pollutants and restrict the discharge of other pollutants if the TMDL is not developed within a ten-year period. These provisions have raised considerable controversy among interested parties.

Consistent with the NPS Plan, the RWQCBs are using a three-tiered approach to TMDL implementation for nonpoint sources:

- Tier 1: Self-determined implementation of BMPs by watershed stakeholders.
- Tier 2: Regulatory-based encouragement of management practices using the authorities of the SWRCB/RWQCBs and other cooperating agencies.
- Tier 3: Effluent limitations and enforcement through permits and orders.

FIGURE 1: RELATIONSHIP OF THE 303(D) LIST AND TOTAL MAXIMUM DAILY LOADS (TMDLS) TO THE STATE'S WATER QUALITY AND MONITORING PROGRAMS



IV. ISSUES RAISED BY THE AB 982 PUBLIC ADVISORY GROUP

Beginning in February 2000, the AB 982 PAG met monthly to discuss the issues of concern regarding SWRCB's 303(d) listing and TMDL processes. PAG members reached consensus on many issues and made recommendations to the SWRCB on how to improve the current processes.

The PAG consensus points and recommendations are quoted below under five general topics-- the need for additional resources; management of public participation and the stakeholder process; listing waters as impaired; development of TMDLs; and implementing TMDLs. An SWRCB discussion of the consensus points and recommendations is included below for each of the five topics.

1. Need for Additional Resources:

- “The PAG finds that there are inadequate resources for the State to fulfill its obligations under the TMDL program. The PAG recommends adequate resources for development and implementation of effective TMDLs statewide. The PAG recommends Regional Boards assess and request resource needs for an adequate 303(d) listing process and TMDL development and implementation, through the State Board from the Legislature.”
- “The Legislature and the Governor should dramatically increase resources available to the SWRCB and the Regional Water Quality Control Boards in order to implement the TMDL Program in California.”
- “The Governor, working cooperatively with the California Congressional Delegation, should aggressively pursue additional federal funds to assist in the implementation of the TMDL Program in California.”
- “The PAG’s recommendations related to the Surface Water Ambient Monitoring Program for the State of California should be implemented immediately.”
- “The SWRCB and Regional Boards should allocate adequate resources and staff positions to develop and maintain appropriate TMDL expertise in-house.”
- “The SWRCB and Regional Boards need an efficient process for acquisition and retention of necessary scientific and technical expertise.”
- “The Legislature should provide adequate funding and staffing to allow the State and Regional Boards to immediately initiate the development and implementation of high priority TMDLs.”

Discussion

The SWRCB agrees with the PAG that more resources are needed to fully implement CWA Section 303(d) requirements. As noted in Chapter III, in recent years there has been a rapid increase in staff and contract resources to support the TMDL effort (see Table 1). The SWRCB has projected a long-term need of 200 PYs and \$10 million to \$15 million in contracts annually to sustain the TMDL effort. This projection assumes an ongoing need to support adaptive management and TMDL revisions. While an apparent gap remains between the projected need and the existing level of support, it is not feasible to add the remaining needed staff or contract resources in a single allocation. Time is needed to recruit and train staff and to execute contracts. The SWRCB will continue its efforts to “ramp up” the TMDL resources to reach the projected need.

In addition to the support for TMDL development, the SWRCB has received a budget increase of 15 PYs and \$3.6 million in contract funds to expand the existing surface water monitoring and assessment program. In response to AB 982, the SWRCB has prepared the proposed SWAMP, which is currently under review. This proposal identifies monitoring needs and specifies the types of monitoring that would be undertaken by the SWRCB and RWQCBs to systematically monitor all waters of the State. Expansion of the ambient monitoring program provides additional information that is needed for the 303(d) listing and the TMDL development efforts. The SWRCB currently supports six Citizen Volunteer Water Quality Monitoring Coordinators. These coordinators are working with citizen groups statewide in an effort titled the Clean Water Team. The Clean Water Team is dedicated to providing high quality information that can be used for listing impaired waters and for TMDL development.

More staff resources have also been dedicated to implementing established TMDLs. In FY 2000-01, the SWRCB received a General Fund augmentation of 21 PYs for implementation of TMDLs. Furthermore, since FY 1999-00, \$1.5 million in federal funds is also dedicated annually to implementation work. Staff available to support implementing TMDLs is expected to increase as the number of established TMDLs increases. Water Code Section 13369 requires a three-tiered approach to nonpoint source pollution control: (1) a self-directed collaborative approach, (2) a regulatory based incentives approach, and (3) the adoption and enforcement of waste discharge requirements (permits). It is anticipated that implementing TMDLs using this framework will require greater staffing levels than currently exist, especially in support of the self-directed, collaborative tier. The SWRCB will need to address the need for watershed coordinators and the need for facilitation of public dialogue on the best approaches to implementation. The State bond fund support (Proposition 13) and federal cost share (e.g., U.S. Department of Agriculture’s Environmental Quality Incentives Program) and grant (e.g., CWA Section 319) programs will provide some financial incentives and support for implementation.

Staff recruitment and retention are an ongoing problem for all State agencies dealing with scientific information. The projected staff need of 200 PYs to support TMDLs doubles the

current available authorized staffing level. Recruiting this large number of qualified people will be difficult. The rate of ramping for staff will affect how successfully we are able to recruit. Retaining technical staff is also difficult due to California's healthy economy. The SWRCB will consider how to address these issues with the Department of Personnel Administration.

Additional staff would allow an increased number of high priority TMDLs to be addressed; however, it is not possible to increase immediately the number of established TMDLs. Staff requires training and orientation. The technical work associated with the assessments and development of implementation options requires time to complete. Currently TMDLs are taking two to four years to reach the point of approved Basin Plan amendments. With the properly managed increase in staff and contract resources, the rate of TMDL adoption will be increased, and high priority problems will be addressed.

2. **Management of Public Participation, the Stakeholder Process and Cross Media/Jurisdiction Issues**

- “Regional Board should be open to input during the TMDL process.”
- “TMDLs need not be based on consensus but everyone needs to be heard.”
- “The Regional Boards should publish schedules for the start of stakeholder participation process.”
- “Recommended framework for the TMDL development should include opportunities for public input for new listing, for scoping of the TMDL, on the draft TMDL and on final adoption.”
- “Develop a mechanism, including funding, to encourage and maintain balanced stakeholder representation, and assure stakeholders are afforded the opportunity to participate meaningfully, in accordance with TMDL deadlines.”
- “Regional Boards should consider education and outreach as part of TMDL development and implementation. Public outreach and education are important aspects in issue resolution and attaining water quality standards.”
- “Taking advantage of the Internet and other information technology, the SWRCB should assure that information generated from monitoring and TMDL related programs is readily available to the public.”
- “The Regional Boards shall seek collaboration with other government agencies with applicable authorities as needed or required to ensure the efficient implementation of the TMDL.”
- “The SWRCB should better coordinate with other agencies where needed to assure full implementation of TMDLs.”

- “TMDLs may, in some instances, involve cross-media sources of pollution that will need to be controlled in order to implement the TMDL. Cal EPA should design and implement a specific mechanism that assures that any TMDL allocation to a source outside the jurisdiction of the RWQCB is adequately enforced and implemented.”
- “In certain circumstances, and where deemed appropriate by the RWQCBs, the process may be modified to allow for expanded or diminished public participation.”

Discussion

The SWRCB agrees that the TMDL process needs to involve the public (stakeholders) to the greatest extent feasible. It is critical that the SWRCB and RWQCBs ensure that the voices of all interested parties are heard and issues are addressed in the TMDL process. To accomplish this requires the SWRCB and RWQCBs to ensure fairness and ample access to all interested parties. Many interested parties have limited means to participate in watershed management groups and TMDL development. It is possible that the process gets extended to a point where some interested parties cannot afford to continue to participate, but key decisions are yet to be made. Timeliness is a delicate issue. While decisions must be pushed forward, in many instances taking the time to resolve issues early in the development process can accelerate the final TMDL and its implementation. The RWQCBs will have to actively manage public involvement to maintain a balance between participation and administrative products. It is hoped that, through public engagement, solutions and management options that are acceptable to all parties can be identified. In some cases, the solutions may not satisfy all parties, and the RWQCBs will need to make decisions recognizing this limitation. The SWRCB will consider options for providing financial support to ensure adequate stakeholder participation and will continue to work with the PAG to develop appropriate approaches.

The SWRCB fully agrees with the PAG that stakeholder involvement, including education and outreach, is a crucial aspect of successful TMDL development and implementation. One approach to enhancing understanding is through the work of the Citizen Volunteer Water Quality Monitoring Coordinators. The work of these staff will help local communities understand how and why information is gathered by the SWRCB and RWQCBs and how it is used in the decision making process. Another approach is the use of the Internet. The SWRCB and RWQCBs have increasingly relied on the Internet as a communication tool. Far more can be done, and the SWRCB will work with the PAG to improve public accessibility to information developed by SWRCB and RWQCBs.

The SWRCB is currently developing a TMDL web page which will be available soon to the public on the SWRCB web site at <http://www.swrcb.ca.gov>. The 303(d) list of impaired water bodies, TMDL schedules, and GIS shapefiles of listed water bodies can currently be found on the SWRCB web site under the “News” heading. Each RWQCB

maintains its own web site with current information about key issues being addressed in the Regions. These web sites will increasingly contain information related to TMDLs.

SWRCB and RWQCB staffs are piloting a model for possible use statewide for storing and retrieving monitoring data. This model will be used in conjunction with USEPA's STORET database and is anticipated to be functional by the end of FY 2000-01. A more permanent system, System for Water Information Management Phase II (SWIM II) will be available in 2003. SWIM II is being designed with a full Internet interface that will allow searches of all posted data bases including STORET.

The activities listed above are all currently evolving and are aimed at improving communication and participation of the public in TMDL development and implementation. Ultimately, TMDLs must be adopted in a formal public hearing process for Basin Plan amendments. To the extent feasible, the SWRCB/RWQCBs will utilize the tools available through the Internet and other opportunities to better inform the public about the hearing process.

Cross-media pollutant control is a complicated issue and the SWRCB/RWQCBs are making efforts to address it. The majority of cross media problems come from aerial deposition of pollutants that has caused part of the pollution in storm water runoff and exceedance of water quality objectives. Discussions have taken place between the SWRCB/RWQCBs, the Air Resources Board, and Air Management Districts on this issue. Future discussions on cross-media pollutant control will most likely be initiated in regard to specific TMDLs where aerial deposition appears to be a contributor to the water quality impairment.

Most public agencies that are participating in TMDL development are involved at the local level with individual TMDLs. Under the leadership of Cal/EPA, cross-jurisdiction efforts are being discussed or are underway with DPR, Department of Forestry and Fire Protection and other federal, State, and local agencies. Furthermore, pursuant to the NPS Plan, the SWRCB and RWQCBs are working with over 20 other State agencies to address nonpoint source problems.

3. **Listing of Waters as Impaired**

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

Discussion

The SWRCB recognizes the need of a statewide listing policy to ensure consistency among RWQCBs. The SWRCB/RWQCBs staff will be developing a statewide policy for adoption by the SWRCB to guide the 303(d) listing process for listings after 2002. Many questions will arise in this process, and there is a need to have better communication among the RWQCBs about assessment and acceptability of data and information. Another factor contributing to the need for a policy is the pending new federal rule which requires a description of the process used for including waters on the 303(d) list. Even without this new federal requirement, the anticipated increase in the amount of monitoring information collected and the elevated interest in the 303(d) list necessitates a revision to the guidelines used for the 1998 listing process. SWRCB adoption of a formal 303(d) listing policy will require a rulemaking process and will require substantial time and public participation to complete. Therefore, the Policy will not be available to address immediate needs to meet the April 2002 deadline for updating the 303(d) list.

The SWRCB also recognizes that there is a need to utilize all acceptable information in decisions regarding impairment of waters. The greatest impediment to using information to date has been the inability to collect and organize the information. This concern will largely be addressed by the improvements currently underway in the collection, storage, and access of available information (SWIM II). Other agencies, such as the U.S. Geological Survey, have also recently upgraded Internet access to their data, thus making it more available in the listing process. Many watershed groups are improving their data storage and reporting as well. One of the goals of the Citizen Volunteer Water Quality Monitoring Coordinators is to provide assistance to local groups in the storage and reporting of their data to the RWQCBs. RWQCB staffs have also intensified their efforts to coordinate with other agencies to identify available information. Watershed programs are actively developing monitoring and assessment information in collaborative forums, and established TMDLs require key monitoring information to be reported to the RWQCBs. This information will be considered in the next revision of the 303(d) list.

4. TMDL Development

- “TMDLs should be established and implemented in accordance with the Clean Water Act and, where applicable, the Porter-Cologne Water Quality Control Act and other relevant State and federal laws.”
- “The SWRCB should commit to the effective and timely implementation of the TMDL Program and, to further that goal, must improve both the pace at which TMDLs are developed as well as the quality of information on which they are based.”
- “Regional Water Quality Control Boards should maintain active oversight over TMDL development sufficient to assure unbiased technical assessment.”

- “All TMDLs should be established as soon as possible recognizing varying levels of TMDL complexity.”
- “The Regional Boards should carefully lay out schedules to get TMDLs completed and implemented.”
- “Through implementation of a variety of means recommended by the PAG, the SWRCB should assume greater responsibility for assuring that State and Regional Board staff have sufficient technical expertise at its disposal to efficiently develop high quality TMDLs.”
- “Ways to assist in completing TMDLs more quickly may include: Training (such as EPA’s Water Quality Academy), Technical Centers (which would allow RWQCBs to share information and approach, Strike forces or teams of SWRCB staff with specific expertise (e.g., nutrients, metals, sedimentation, etc.) that could address TMDL development in Regions, bring in staff from other agencies to assist in TMDL development (e.g., on pesticide issues), start some difficult TMDLs early as opposed to tackling the easy ones only at first (makes schedules more realistic); group related pollutants to expedite TMDL technical work (e.g., working on multiple pollutants in a water body).”

Discussion

Currently, the SWRCB/RWQCBs are developing TMDLs with programs of implementation clearly articulated and establishing them as formal Basin Plan amendments in accordance with both the CWA and the Porter-Cologne Act. However, in some cases involving court-approved consent decrees, imposed time limitations prevent completion of the formal process. The formal process requires a substantial investment of time and resources. The schedules that have been developed to date consider these resource commitments. The TMDL schedule contained in the 303(d) list is specifically conditioned on the availability of adequate resources to adhere to the schedule. While there has been a significant increase in resources recently for the TMDL effort, the estimated need still exceeds the available funding.

Because of the difficulty of estimating future resources, the SWRCB/RWQCBs have avoided establishing long-term TMDL schedules in the past. As part of the WMI annual planning effort, the RWQCBs develop a short-term funding projection and a five-year planning schedule for TMDLs. The funding schedule identifies how baseline funds will be allocated to individual TMDLs for the next three years and immediate needs for funding augmentations. The five-year schedule identifies the priority TMDLs for the next five-year period.

TMDL development is an evolutionary process at our level of experience. While we know what the minimum legal requirements are for TMDLs, it is very difficult to forecast specific resource needs for the highly variable individual TMDLs. Moreover, the needs, capabilities, and resources available in one situation and location vary dramatically from those in another. The PAG has identified a number of options and methods for SWRCB/RWQCBs to consider

in future TMDL development. The need for creativity and the urgency to rectify water quality impairments compels a serious consideration of new methods to approach the challenge. The SWRCB looks forward to evaluating, with the PAG's assistance, some of the ideas developed to date. It is also important for the SWRCB and RWQCBs to recognize the need for affirmative steps. In many cases, it will not be possible to define "the best or most effective" management option. Instead, it will be necessary to consider the implications of proposed actions and take steps that move towards sustainable water quality protection. The adaptive management strategy will allow actions to be taken that correspond to our knowledge base, while further science is applied to clarify those parts of the management problem that are currently uncertain.

Current actions taken by the SWRCB to assist in the development of TMDLs include forming a TMDL Team to support and provide assistance to the RWQCBs and sponsoring various types of TMDL training, including modeling, statistical analysis, and USEPA workshops. Representatives of SWRCB/RWQCBs and cooperating agencies have formed workgroups to share information on TMDL development and to work together to develop TMDLs for pollutants that are statewide concerns. Contract funds are being used to fill many of the information gathering needs required for TMDL development.

The application of modeling techniques provides an opportunity for significantly improving TMDL development and the adaptive management efforts of the SWRCB/RWQCBs and stakeholders. The SWRCB/RWQCBs are continuing to expand existing modeling capabilities and will increase their reliance on GIS and modeling tools in future TMDL work. In addition to providing improved technical evaluations, models can serve as effective communication tools for public discussion of TMDLs. The SWRCB/RWQCBs will evaluate the ability of models to improve communication and public engagement in the TMDL effort.

Role of Science

- "The State and Regional Boards should encourage, where appropriate, early external peer review."
- "Science should play a role in the development of TMDLs."
- "The level of scientific understanding and technical rigor will vary for individual TMDLs."

Discussion

Health and Safety Code Section 57004 requires an independent peer review of the technical elements of any SWRCB or RWQCB rulemaking action. The peer review process occurs after completion of the documents (e.g., TMDLs). The law precludes anyone who has contributed to the development of the proposed action from acting as a peer reviewer. In some cases, this restriction has limited the ability to engage early

peer review because of the limited number of experts available. This occurs because most TMDLs are being developed with contract assistance from experts. Identifying a second group of experts to independently review the ongoing work and then a third group to comply with the Health and Safety Code mandated review could exhaust the available experts.

While the SWRCB and RWQCB are dedicated to maintaining technical expertise, we recognize that the need to evaluate cumulative effects of pollutants may exceed the existing staff expertise. Therefore, development of TMDLs will continue to require contract assistance in the collection and interpretation of information. Early input into TMDL development currently occurs during the stakeholder process, which includes input from all interested parties.

The SWRCB recognizes that scientific and technical information is the foundation of TMDLs. The TMDL elements described in Appendix D outline the basic scientific and technical requirements of TMDLs. The level of information required for an adequate understanding of each specific pollutant being addressed in a TMDL varies depending on the complexity of watershed activities and pollutant dynamics. The margin of safety component of the TMDL is included to account for technical uncertainty.

Legacy Pollutants

- “Consistent with achieving water quality standards, the Regional Boards should establish a waste load or load allocation for sources of legacy pollutants that are currently contributing to the impairment.”
- “The State and Regional Boards should aggressively use existing legal authorities to identify and hold responsible those parties contributing legacy sources of pollutants causing impairments.”

Discussion

TMDLs must incorporate into the analyses all identified sources of the pollutant of concern. Legacy pollutants pose unique problems because they often are not associated with a currently identifiable party or parties. In this case, it falls on government entities to address controls of those pollutants. The situation is compounded by the fact that in many cases there is not a readily available intervention technique that can result in attainment of water quality standards. Examples of this are the discharges from Iron Mountain mine in northern California and mercury contamination of the San Francisco Bay-Delta. In each case clear steps towards reducing pollution are identifiable, but in neither case can these management measures attain standards in the near future.

In the case of Iron Mountain mine, over \$100 million dollars has been dedicated to controlling the release of metals and acid from the mine. However, the discharge, even after treatment, will continue to exceed the applicable water quality standards.

Similarly in the San Francisco Bay, mercury that was mined in the coastal range and used in historic gold mining is now contaminating sediments throughout the Bay. Wave action in the Bay continually disturbs these sediments, resulting in continued exceedance of water quality standards. To date, no identified intervention can ensure attainment of standards. However, reducing ongoing loading from the New Almaden mining area in the South Bay will help reduce ongoing discharges into the San Francisco Bay-Delta. The RWQCB has targeted this area for mine remediation. The SWRCB has also helped initiate a program to collect mercury found in streams of the Sierra Nevada by recreational miners.

Not all legacy sources are as intractable as those noted above. The mere fact that a pollutant was placed in the water body by a party who is no longer present does not mean that no action will be required or that water quality standards will not be attained. The TMDL must be developed to attain standards. In the case of legacy pollutants, the timeframe for standards attainment may depend on natural processes, such as sediment transport. Where possible, the RWQCBs intend to accelerate the remediation of the water body. This may require assigning responsibility for legacy pollution to current or former interests working in the watershed. At the same time, the reasonableness of any requirement must be weighed according to the considerations presented in the Water Code. In some cases, this may mean building into a TMDL long timeframes for expected recovery of the water body.

The search for responsible parties can be a lengthy and resource intensive undertaking. In cases where a clear connection can be made to an entity or entities responsible for the pollutants, the RWQCBs will take all actions to hold such entities accountable. In other cases, the management of the legacy pollution will require collaborative efforts among watershed stakeholders, taking into consideration of balancing the actions and the economic impact.

5. **TMDL Implementation Plans and Implementation**

- “The PAG encourages the RWQCBs to consider TMDL development when approving Supplemental Environmental Projects (SEPs) not otherwise legally required of dischargers.”
- “The Implementation Plan is an essential part of the TMDL process.”
- “The Implementation plan is the blueprint which governs actions by all contributing sources to meet TMDL targets.”
- “The Implementation Plan should be a formal written document that should be adopted by a Regional Board when they adopt the corresponding TMDL.”
- “Implementation plans should identify specific control and/or management actions for all sources or categories of sources of pollutants consistent with the Clean Water Act, and where applicable, the Porter-Cologne Water Quality Control Act.”

- “The implementation plan may include interim milestones for load reductions.”

Discussion

The SWRCB fully agrees that implementing corrective actions is the key activity that will make TMDLs successful. Merely stating a desired level of pollutant control is not sufficient to guarantee that corrective actions will be taken. Laying out a strategy for implementing water quality control measures is required by the Porter-Cologne Act. The RWQCBs are required to have a program of implementation as part of the Basin Plan. TMDLs can be written to augment that program, or they can be written as a new Basin Plan amendment with a program of implementation to specifically address the numeric limitations. In either case, the RWQCBs must specify the strategy for implementation (Water Code Section 13263), but they are prohibited from directing the manner in which implementation will be carried out (Water Code Section 13360). This is one of the reasons the RWQCBs have put so much emphasis on their stakeholder processes. It is critical that affected parties are clear about the scope and requirements contained in a TMDL and the accompanying implementation strategy.

SEPs are projects that receive support from fines imposed as part of the RWQCB's enforcement actions. The use of SEPs is actively being discussed at the SWRCB and RWQCBs. In some cases, SEPs have already been used to assist with TMDLs. SEPs may not be used to support SWRCB/RWQCB staff. The RWQCBs may consider the use of SEPs to fund TMDL development in cases where no potential conflict of interest exists. The SWRCB is currently considering amendments to the Water Quality Enforcement Policy that will provide consistency among RWQCB enforcement actions, including acceptable uses and conditions for using fine money to support SEPs. SWRCB staff will continue to discuss with the PAG on the possible ways to use SEPs to assist in TMDL development and implementation.

Federal regulations require that NPDES permits be made consistent with any applicable TMDL when the permits are being revised. In that sense, a mandated implementation strategy is already incorporated into federal regulations for point source discharges. The point source dischargers fear that the fact that such a mandate exists for NPDES permittees but not for other sources of pollution means that the permittees will be charged with the responsibility for all the pollution in the water body regardless of the relative contribution of the point source. While there is no explicit formula for balancing responsibility for implementation, the SWRCB and RWQCBs repeatedly emphasize their intent to pursue fair assessments of responsibility. Balancing what can reasonably be accomplished and the associated impacts is a fundamental responsibility placed on the SWRCB/RWQCBs by the Water Code. To the extent that allocations and effective actions can be identified for each source of pollution, it is expected that these sources will be included in the programs of implementation.

Implementing TMDLs often requires program support from NPDES, storm water, nonpoint source, and monitoring programs. Many other programs, including programs of other

agencies, are also involved in implementation. The TMDL implementation strategy normally contains milestones of progress that identify whether the proposed actions are being carried out in an effective manner. Various enforcement mechanisms can be associated with the implementation provisions, depending on how the TMDL is constructed. For example, timely implementation is overseen by the RWQCBs, but it is dependant on the watershed stakeholders that receive pollutant load/wasteload allocations. The RWQCBs must act to ensure their own programs are acting in a timely manner and that other parties involved in the TMDL are on schedule.

In many cases, TMDLs can identify straightforward actions that will reduce pollutant loads. Often, however, these actions alone cannot ensure that water quality standards will be attained. Identifying the next set of actions is far more difficult due to the fact that they tend to require information that is not readily available, either for developing the actions or for evaluating their utility. Rather than insist on a course of action with little confidence in the outcome, the SWRCB and RWQCBs have opted for an adaptive management approach. This adaptive process requires that milestones for implementation be included in the implementation strategy. The milestones can take the form of pollutant reduction levels or discrete actions completed within a specified timeframe. It allows for the scientific investigation of uncertain aspects of the management effort.

V. PROPOSED EVALUATION CRITERIA

The evaluation criteria proposed in this chapter are intended for future discussions with the PAG on how to evaluate the effectiveness of SWRCB's TMDL efforts. The SWRCB/RWQCBs are in the developmental stages of the statewide TMDL efforts. In order to continuously improve our program and to develop future reports, such as those required by AB 982, that evaluate the effectiveness of the 303(d) listing and TMDL efforts, it is necessary to develop evaluation criteria at the outset to establish the basis for the evaluation.

The SWRCB/RWQCBs have completed the listing process for a number of years. However, only beginning with the 1998 listing did the number of impaired waters increase so dramatically and the consequence of actually requiring a TMDL for each listing become so real. The SWRCB/RWQCBs' experience in these areas is expanding rapidly. Therefore, the following proposed evaluation criteria are subject to revision as these efforts progress. In order to use these criteria in the future, information will need to be compiled that may not currently be collected. This may result in unmet resource needs. The proposed statewide Surface Water Quality Ambient Monitoring Program, the subject of a November 2000 AB 982 report, will contribute to this evaluation if implemented. The following preliminary evaluation criteria are specific to the 303(d) listing process, TMDL development process, and TMDL implementation.

Criteria for Evaluating the Effectiveness of the 303(d) Listing Process

The following criteria are being considered for use in evaluating the effectiveness of the State's 303(d) listing process. Specific evaluation tools for each criterion are needed to measure effectiveness and progress, some of which are also described below:

1. **Water Quality Information.** This criterion will evaluate the extent to which chemical, biological (including toxicity and bioassessment), and physical data and land use assessments are used to identify impaired water bodies. Evaluation tools will include the number of parameters measured; the annual budget allocations and expenditures for SWRCB/RWQCBs' monitoring programs; and the year-to-year trends in budget allocations and expenditures.
2. **Geographic Coverage.** This criterion will evaluate the percentages of different types of water bodies (such as rivers, lakes, and wetlands) being monitored and assessed and the geographic distribution of samples collected throughout the State. The Watershed Monitoring Plans will be evaluated. Evaluation tools will include relevant information from the State and Regional monitoring and assessment programs and information collected from outside sources.
3. **Data Quality.** This criterion will evaluate the existence and use of quality assurance/quality control for water quality data used in the 303(d) listing process. It will also evaluate the use of consistent analytical methods for all types of monitoring data.

4. **Data Management.** This criterion will evaluate the availability of water quality data management systems for access by the SWRCB and RWQCBs and by the public.
5. **Consistency.** This criterion will evaluate the availability and use of consistent instructions for the listing process among the RWQCBs.
6. **Public Participation.** This criterion will evaluate the degree of public participation in the listing process. Evaluation tools will include the number of groups providing data for water quality assessments (e.g., watershed groups, citizen monitoring groups, environmental groups, government agencies, and permittees) and an assessment of the SWRCB/RWQCB' public comment and responsiveness process.
7. **Staff Resources.** This criterion will evaluate whether staff resources at the SWRCB and RWQCBs were dedicated to the formal listing process and to the ongoing collection of watershed level information required to conduct water quality assessments.

Criteria for Evaluating the Effectiveness of the State's TMDL Process

The following criteria are being considered for use in evaluating the State's TMDL development and implementation processes:

TMDL Development

Although these criteria track internal agency performance, they can serve as checkpoints along the way to water quality improvements.

1. **TMDL Development.** This criterion will evaluate the number of TMDLs and their status in the development process. Evaluation tools will consist of tracking the progress of TMDLs initiated, TMDLs under development, TMDLs completed, TMDLs approved by USEPA, and TMDLs approved as Basin Plan amendments.
2. **TMDL Time Requirements.** This criterion will measure the length of time required to complete TMDLs from beginning to adoption as Basin Plan amendments in accordance with their complexity.
3. **Annual Federal and State Workplans.** This criterion will evaluate whether: (1) the workplans were submitted on time; (2) the workplan tasks were completed on time; (3) the budget (including staff resources) was adhered to; and (4) the reporting elements (such as quarterly reports) of the workplans were completed on time. The evaluation tools will be the workplans.
4. **Interagency Involvement.** This criterion will evaluate the extent of cooperation among agencies on TMDL issues. Evaluation tools will include a listing of those federal, State, and local agencies that are participating in TMDL development.

5. **Public Outreach.** This criterion will evaluate the comprehensiveness of the SWRCB/RWQCBs' outreach program. Evaluation tools will include tracking SWRCB/RWQCB staff time spent working with public groups; maintaining SWRCB/RWQCBs' TMDL web sites for timely updates and user visits; evaluating whether reports to the public on water quality and TMDLs are being regularly produced and distributed; and tracking the number of other media productions (videos, television programs, and public service announcements) on TMDLs.
6. **Public Involvement.** This is related to the previous criterion because it will evaluate the public's response to the SWRCB/RWQCBs' outreach efforts. Evaluation tools will include tracking the number of watershed stewardship groups and citizen monitoring groups working with the SWRCB and RWQCBs and the number of public contacts (such as telephone calls and requests for information).
7. **Staff Resources.** This criterion will evaluate whether the allocated staff resources were dedicated to the necessary tasks and whether they were adequate to perform the necessary tasks. Evaluations will be conducted by determining staff charges to various tasks and the deliverables (such as TMDLs completed).

TMDL Implementation

These criteria will measure actual implementation of the TMDLs and the resultant improvements in water quality. However, it should be recognized that water quality changes will generally occur over long timeframes. For some pollutants, sources, and management measures implemented in a watershed, it can take decades before improvements in water quality can be consistently documented.

1. **Measurable Water Quality Improvements.** This criterion will evaluate incremental improvements in water quality. These improvements may not be large enough for delisting, but nevertheless indicate positive trends in water quality. The evaluation tool will be data and reports from SWRCB/RWQCBs' monitoring and assessment programs.
2. **Removal of water bodies from the 303(d) list.** This criterion will evaluate the number of water bodies that are removed from the 303(d) list because of improvements in water quality. The evaluation tool will be the 303(d) list.
3. **Public Outreach.** The success of TMDL implementation depends heavily on an effective public outreach and education strategy. This criterion will evaluate the comprehensiveness of the SWRCB/RWQCBs' outreach program. Evaluations tools will include tracking the number of SWRCB/RWQCBs' staff working with public groups; evaluating whether the SWRCB/RWQCBs' TMDL web sites are being maintained with up-to-date-information; evaluating whether reports to the public on water quality and TMDLs are being regularly produced and disseminated; and tracking the number of other media productions (videos, television programs, and public service announcements) on TMDLs.

4. **Public Involvement.** This is related to the previous criterion because it will evaluate the public's response to the SWRCB/RWQCBs' outreach efforts. Evaluation tools will include tracking the number of watershed stewardship groups and citizen monitoring groups working with the SWRCB and RWQCBs; the number and dollar amount of grants (e.g., CWA Section 319(h) and Proposition 13) allocated to water quality improvement projects.
5. **NPDES Permit Revisions.** This criterion will evaluate the incorporation of TMDLs into NPDES permits. Evaluation tools will include counting the number of NPDES permits revised due to TMDLs.
6. **BMPs.** This criterion will evaluate the extent of hard and soft BMPs implemented to address load allocation from nonpoint source discharges. The primary evaluation tool will be tracking of BMP implementation in the vicinity of 303(d) listed water bodies.
7. **Staff Resources.** This criterion will evaluate whether the allocated staff resources were dedicated to the necessary tasks and whether they were adequate to perform the necessary tasks. Evaluations will be conducted by determining staff charges to the implementation task and the deliverables (such as reports on assessment of TMDL-related water quality improvements).

VI. CONCLUSION

TMDLs have taken on a dimension that can carry water quality management forward if properly managed to maintain a focus on improving water quality (as opposed to simply documenting planning targets). The effort is growing rapidly and is beginning to realize results both in the establishment of TMDLs and the management of water quality.

There are many areas to target improvement in the current effort. The most pressing areas needing improvement are in communication and engagement of the public. Secondly, we need to ensure that new staff is trained and provided with the appropriate skills to develop TMDLs. Technical issues of water quality assessment and analytical approaches to developing allocations and total loads will continue to be important areas for attention, particularly, the application of modeling techniques to assessment, allocations, and implementation planning.

In the coming year, we need to continue to develop TMDLs expeditiously. We also need to undertake efforts to revise the 303(d) list. The following areas will be targeted for an increased level of effort in 2001:

1. **Public Communication:**

- Improve web site information: SWRCB/RWQCBs' Internet web will be revised and/or updated to provide more complete and timely information about current TMDL and 303(d) listing efforts.
- The Clean Water Team will work with citizen volunteer water quality monitoring groups to provide improved connections to RWQCB activities.
- Efforts to upgrade data management systems will be pursued to provide more transferable monitoring data and improve the sharing of information among interested parties.

2. **Listing of Impaired Waters**

- SWRCB and RWQCBs will more actively solicit information about the condition of the State's waters from the public and government agencies.
- The review of information provided in response to the solicitation and information developed by the SWRCB and RWQCBs will be undertaken in the preparation for the next revision of the 303(d) list (due to USEPA in April 2002).
- Staff will work on developing a statewide policy for adoption by the SWRCB providing direction to SWRCB staff and RWQCBs on the process of listing of impaired waters. (This policy will be for listings completed after 2002.)

3. **Staff Training**

- Training in Basin Plan amendment procedures, TMDL development, and management and facilitation of public meetings will be provided to staff.

- Technical training in the application of models and assessment of water bodies will be developed.

4. TMDL Development and Adoption

- Planning and workplans for TMDL work statewide will be improved
- Approximately 48 TMDLs will be brought forward for RWQCB consideration as Basin Plan amendments by June 2002.
- Approximately 125 TMDLs will be under development.

5. Future Tasks for SWRCB and PAG

The SWRCB will continue to work with the PAG to explore feasible solutions to the issues concerning:

- **Offset Programs**--Offset programs allow the discharge of a specific pollutant to continue at a prescribed rate in exchange for a reduction in the discharge of the same pollutant from a different source in the same watershed. Offset programs may not conflict with any existing water quality regulations.
- **Use of SEPs to fund TMDL development**--SEPs are environmental enhancement projects which are funded using fines levied as a result of enforcement actions. Some examples of SEPs are pollution prevention, environmental restoration, public outreach and education, and watershed assessment projects.
- **Legacy Pollutants**--Legacy pollutants are those which are the result of historical discharges and usually do not have readily identifiable responsible parties.
- **Ways to advance timely development of TMDLs**--The SWRCB is interested in considering new and creative ways by which to expedite TMDL development and implementation.

Appendix A

AB 982 PUBLIC ADVISORY GROUP MEMBERS

AB 982 PUBLIC ADVISORY GROUP MEMBERS

MEMBER	ALTERNATE
Tess Dunham California Farm Bureau	Brad Luckey Imperial Irrigation District
Paul Martin Western United Dairymen	David Albers Milk Producers Council
Bill Thomas California Cattlemen's Association	Patrick Blacklock California Cattlemen's Association
Mark Rentz California Forestry Association	Mark Pawlicki Simpson Timber Company
Cliff Moriyama California Building Industry Assn.	Sat Tamaribuchi The Irvine Company
Jim Scanlin Alameda Co. Storm Water Program	Armand Ruby Larry Walker & Associates
Craig Johns California Resource Strategies	Dave Arrieta DNA Associates
Patti Krebs Industrial Environmental Association	David Ivester Bay Planning Coalition Randal Friedman Navy Region Southwest
Roberta Larson CASA	Vicki Conway County Sanitation Districts of LA County
Jim Noyes Chief Deputy Director	Allen Campbell Humboldt County Public Works
Dave Kiff City of Newport Beach	David W. Tucker City of San Jose
Peter MacLaggan California Urban Water Agencies	David Bolland Association of CA Water Agencies
Linda Sheehan Center for Marine Conservation	Cori Fay Traub Clean Water Action

MEMBER	ALTERNATE
Jonathan Kaplan Waterkeepers Northern California	Bill Jennings Deltakeeper
Bob Caustin Defend the Bay	Bonnie Ahrens Defend the Bay
Donna Meyers Coastal Watershed Council	Alan Levine Coast Action Group
Marco Gonzales Surfrider Foundation	Emily Roberson California Native Plant Society
Leslie Mintz Heal The Bay	Heather Hoecherl Heal the Bay
Bruce Reznik San Diego Baykeeper	Julie Hamilton San Diego Baykeeper
Lynn Barris Butte Environmental Council	Leah Wills Plumas Corp
Barbara Vlamis Butte Environmental Council	Allen Harthorn Friends of Butte Creek
Dave Paradies Bay Foundation Morro Bay	John Robinson Heal the Ocean
David Beckman NRDC	Steve Fleischli Santa Monica BayKeeper
Nicole Capretz Environmental Health Coalition	Laura Hunter Environmental Health Coalition

APPENDIX B
TMDL REQUIREMENTS
(CLEAN WATER ACT AND CFR CITATIONS)

TMDL REQUIREMENTS (CLEAN WATER ACT AND 40 CFR CITATIONS)

Clean Water Act

§ 303(d)(1)(A):

Each state shall identify those waters within its boundaries for which the effluent limitations required by section 301(b)(1)(A) and section 301(b)(1)(B) are not stringent enough to implement any water quality standard applicable to such waters. The State shall establish a priority ranking for such waters, taking into account the severity of the pollution and the uses to be made of such waters.

§ 303(d)(1)(C):

Each state shall establish for the waters identified in paragraph (1)(A) of this subsection, and in accordance with the priority ranking, the total maximum daily load, for those pollutants which the Administrator identifies under section 304(a)(2) as suitable for such calculation. Such load shall be established at the level necessary to implement the applicable water quality standards with seasonal variations and a margin of safety, which takes into account any lack of knowledge concerning the relationship between effluent limitations and water quality.

§ 303(d)(1)(B):

Each state shall identify those waters or parts thereof within its boundaries for which controls on thermal discharges under section 301 are not stringent enough to assure protection and propagation of a balanced indigenous population of shellfish, fish, and wildlife.

§ 303(d)(1)(D)

Each state shall estimate for the waters identified in paragraph (1)(B) of this subsection the total maximum thermal load required to assure protection and propagation of a balanced, indigenous population of shellfish, fish, and wildlife. Such estimates shall take into account the normal water temperatures, flow rates, seasonal variations, existing sources of heat input, and the dissipative capacity of the identified waters or parts thereof. Such estimates shall include a calculation of the maximum heat input that can be made into each such part and shall include a margin of safety which takes into account any lack of knowledge concerning the development of thermal water quality criteria for such protection and propagation in the identified waters or parts thereof.

Note: Administrator refers to the administrator of U.S. EPA. § 301 references relate to technology based effluent limits required for point sources. § 502 of the Act defines point sources. Nonpoint sources are not explicitly defined in the Act. § 304 requires the Administrator to publish water quality criteria and to identify pollutants suitable for TMDL development.

Code of Federal Regulations, Part 40 (paraphrased, actual text not included):

§ 130.2(f), Loading Capacity:

The greatest amount of loading (introduction of a pollutant) that a water can receive without violating water quality standards.

§ 130.2(d), Water Quality Standards:

Provisions of state or federal law, which consist of designated uses or existing uses and water quality criteria for those uses in those waters. Standard must be designed to protect the public health or welfare, restore and maintain the biological, physical, and chemical integrity of the waters, and enhance water quality.

§ 130.2(i), Total Maximum Daily Load (TMDL):

The sum of the individual Waste Load Allocations and Load Allocations and natural background. Can be expressed in mass per time, toxicity, or other appropriate measure. Waste load allocations (and therefore effluent limits) can be made less stringent (than application of standards using existing formulas might suggest) if implementing Load Allocations can provide sufficient reductions to assure attainment of standards.

§ 130.2(g), Load Allocations:

The portion of a receiving water's loading capacity attributed to natural background or present or future nonpoint sources.

§ 130.2(h), Wasteload Allocations:

The portion of a receiving water's loading capacity allocated to one or more of its existing or future point sources.

§ 130.7(a), TMDLs, General:

The states continuing planning process shall describe the process for identifying water quality limited segments needing TMDLs, priority setting, and how the TMDLs are developed and implemented (including public participation). [Note: 40 CFR § 130.5 states that the State may determine the format of its CPP as long as the minimum requirements are met. California has used a CPP document, written reports, conferences, workgroups, program workplans, and ongoing management discussions to fulfill CPP requirements.)

§ 130.7(b), Identifying and priority setting for water quality limited segments:

Requires states to identify and rank in priority all water bodies not attaining standards due to pollutants and thermal discharges. Standards include numeric or narrative criteria, beneficial uses and antidegradation (see § 303 and 40 CFR 131). List must identify suspected pollutant of concern. Priority must take account of severity of pollution and beneficial uses. In developing the list, states must assemble and evaluate readily available information; i.e., from § 305(b) report or § 319 (nonpoint source) assessment, files, agency or university reports, or reports from the public. Listing decisions must be documented. Must explain any non-listing where readily available information suggests a problem (e.g., bad QA, countervailing information, etc.)

§ 130.7(c), Development of TMDLs:

A TMDL is required for each listed water body. The TMDL must be set at a level sufficient to attain and maintain applicable standards with seasonal variation and a margin of safety. TMDLs must account for critical conditions. May use pollutant specific or cumulative (i.e., biomonitoring) approach and must account for all pollutants suspected of preventing attainment of standards.

§ 130.7(d), Submission of lists and TMDLs to USEPA for approval:

List of water quality limited segments must be submitted to USEPA for approval once every two years (by April 1 of even numbered years). EPA must make any changes it deems appropriate then send the list and TMDLs back to the State for incorporation into Basin Plans.

§ 130.6(c), Water Quality Management Plans:

Basin Plans serve as California's Water Quality Management Plans (i.e., § 130.7(c), applies to Basin Plans for purposes of implementing the Clean Water Act). Several elements are required to be included directly or by reference including any TMDLs approved by USEPA.

Appendix C

California's 303(d) Listing Process for 1998

California's 303(d) Listing Process for 1998

In the 1998 process, the nine RWQCBs assembled water quality data received from government agencies and the general public, and other types of information such as information on the flow, habitat, and vegetation conditions. The RWQCBs used the data to compile the regional 303(d) lists. Each RWQCB conducted a 30-day public review process. The regional lists were submitted to the SWRCB for review and merged into the statewide 303(d) list. The list includes pollutants and stressors (factors other than pollutants, which have a detrimental effect on beneficial uses – e.g., water flow), probable sources, TMDL priorities and schedules for completion. The lists were prepared using data from the SWRCB's Georeferenced Waterbody System (GeoWBS) database. This database is a catalogue of the State's major water bodies and contains information about water body size, specific pollutants, sources of pollutants, and affected uses. It identifies the general condition of the uses supported by each water body. The information in this database is provided by RWQCBs. The SWRCB conducted a public workshop on the statewide list, followed by a public meeting for approval of the list. The SWRCB submitted the statewide list to USEPA for approval. USEPA reviewed and partially approved the list. USEPA disapproved the fact that certain waters and pollutants were left off the list. USEPA established the final list, including the omissions they identified, pursuant to the federal requirements.

Steps for Update of the 303(d) List

SWRCB, RWQCB, and USEPA staffs prepared a guidance document in 1997 to assist RWQCBs in updating their 1998 303(d) lists. It included guidelines to be used by RWQCB staff as a basis for listing and delisting water bodies, prioritizing and scheduling TMDLs, and public noticing. This process included reexamining previously listed water bodies, reviewing all readily available monitoring information, soliciting information from other State and federal agencies, and inviting the public to participate.

RWQCB staff followed the following steps to develop and complete the 303(d) list for each region:

1. Solicit from government agencies and the general public available information on water bodies in the region.
2. Review available information and decide which water bodies to list or delist, using the 1997 SWRCB Listing Guidelines prepared by SWRCB/RWQCB and USEPA staffs.
3. Assign priorities of high, medium or low for completion of TMDLs for the pollutants or stressors of the listed water bodies. Assign dates for TMDL completion. Prepare a proposed 1998 303(d) list and TMDL priority schedule.
4. Invite public comments in a public notice period of at least 30 days. Public notice is provided through newspapers and/or through each RWQCB's public hearing process.

5. Prepare responses to comments received during the public comment period. Revise the proposed list as needed, based on public input.
6. Submit the proposed list to the RWQCB for approval.
7. Transmit the RWQCB approved list to the SWRCB for consolidation into the statewide list. The RWQCB submittals to the SWRCB included copies of public notices, resolutions and staff reports. The staff report contains the 303(d) list, the rationale for listing and delisting, public comments and staff responses.

The SWRCB provided public notice of a Workshop to review comments on the nine RWQCB lists. At the Workshop, the SWRCB Members heard public comments and responses from RWQCB staff. After the Workshop, SWRCB staff summarized oral and written comments and made recommendations for discussion at a subsequent public meeting. Approval of the statewide 303(d) list for submittal to USEPA occurred at an SWRCB public meeting.

For all updates, USEPA reviews the State's list and approves or disapproves it. If the list is disapproved, USEPA proposes a modified list with a 30-day public comment period. The USEPA's final list becomes the State's list for the next two years. This will change to four years when the new federal rule becomes effective.

1998 Listing Guidelines

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

A. Introduction

The Total Maximum Daily Load (TMDL) Workgroup¹ identified the need to develop statewide consistency on 303(d) listing issues. At its roundtable meeting on April 30, 1997, the workgroup decided to develop 303(d) listing guidelines that would be acceptable to the Regional Water Quality Control Boards (RWQCB), State Water Resources Control Board (SWRCB), and U.S. Environmental Protection Agency (U.S. EPA). Three work teams were formed to address various 303(d) listing issues. Each team met several times to develop a draft work team product. The work team products were circulated for comment from the TMDL workgroup and the drafts were revised by the work teams. The TMDL workgroup held a second roundtable meeting on July 28, 1997 to review the integrated product of the three work teams, and revisions to the listing guidelines were made (a list of attendees at the TMDL roundtable meetings and work team members is attached).

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

B. Listing Factors

The following factors were developed to provide for consistent statewide decisions on listing California surface water bodies under CWA Section 303(d). However, they are meant to be flexible, and the RWQCBs should exercise judgment based on the specific circumstances for each water body. The listing factors will be reviewed periodically and may be revised to reflect new scientific information or newly developed water quality criteria (e.g., sediment criteria, criteria for evaluation of wetland functions). Information sources which should be considered include sources listed in 40 CFR 130.7(b)(5) and sources found in Appendix D of the 1996 305(b) Guidance from U.S. EPA.

Water bodies may be listed if any one of these factors is met²:

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

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

1. Effluent limitations or other pollution control requirements [e.g., Best Management Practices (BMPs)] are not stringent enough to assure protection of beneficial uses and attainment of SWRCB and RWQCB objectives, including those implementing SWRCB Resolution Number 68-16 “Statement of Policy with Respect to Maintaining High Quality of Waters in California” [see also 40 CFR 130.7(b)(1)].
2. Fishing, drinking water, or swimming advisory currently in effect. This does not apply to advisories related to discharge in violation of existing WDRs or NPDES permit.
3. Beneficial uses are impaired or are expected to be impaired within the listing cycle (i.e., in next two years). Impairment is based upon evaluation of chemical, physical, or biological integrity. Impairment will be determined by “qualitative assessment”³, physical/ chemical monitoring, bioassay tests, and/or other biological monitoring. Applicable Federal criteria and RWQCB Water Quality Control Plans determine the basis for impairment status.
4. The water body is on the previous 303(d) list and either: (a) “monitored assessment”⁴ continues to demonstrate a violation of objective(s) or (b) “monitored assessment” has not been performed.
5. Data indicate tissue concentrations in consumable body parts of fish or shellfish exceed applicable tissue criteria or guidelines. Such criteria or guidelines may include SWRCB Maximum Tissue Residue Level values, FDA Action Levels, NAS Guidelines, and U.S. EPA tissue criteria for the protection of wildlife as they become available.
6. The water quality is of such concern that the RWQCB determines the water body needs to be afforded a level of protection offered by a 303(d) listing.

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

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

C. Delisting Factors

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

1. Objectives are revised (for example, Site Specific Objectives), and the exceedence is thereby eliminated.
2. A beneficial use is de-designated after U.S. EPA approval of a Use Attainability Analysis, and the non-support issue is thereby eliminated.
3. Faulty data led to the initial listing. Faulty data include, but are not limited to, typographical errors, improper quality assurance/quality control (QA/QC) procedures, or Toxic Substances Monitoring/State Mussel Watch EDLs which are not confirmed by risk assessment for human consumption.
4. It has been documented that the objectives are being met and beneficial uses are not impaired based upon “Monitored Assessment” criteria.
5. A TMDL has been approved by the U.S. EPA.
6. There are control measures in place which will result in protection of beneficial uses. Control measures include permits, clean up and abatement orders, and watershed management plans which are enforceable and include a time schedule.

D. Priority Ranking, Targeting, and Scheduling

Priority Ranking

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

- water body significance (such as importance and extent of beneficial uses, threatened and endangered species concerns and size of water body)
- degree of impairment or threat (such as number of pollutants/stressors of concern, and number of beneficial uses impaired or threatened)
- conformity with related activities in the watershed (such as existence of watershed assessment, planning, pollution control, and remediation, or restoration efforts in the area)
- potential for beneficial use protection or recovery

- degree of public concern
- available information

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

Scheduling and Targeting

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

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

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

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

E. Public Notice Procedures

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

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

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

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

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

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

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

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

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

The RWQCB should consider the following:

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

F. 303(d) List Submittal Package

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

1. The 303(d) list of water bodies (referenced on maps, if feasible), pollutant or stressors, pollutant sources, extent of impairment (e.g., miles of stream, acres of estuary), TMDL priority ranking and schedule for TMDL development for all listed water bodies by the RWQCB; and
2. List of water bodies and associated watersheds (referenced on maps, if feasible) which were assessed in the current cycle; and
3. Factors used to list or delist specific waterbodies (see sections B and C). Criteria used to prioritize TMDL development (see section D.1.). Criteria used to generate TMDL development schedules (see section D.2.); and
4. Documentation for TMDL priority ranking and scheduling decisions, which may include an estimate of resource needs for high priority water bodies for TMDL development; and
5. Documentation of the public participation process
 - a. public notice(s)
 - b. responsiveness summary; and
6. List of RWQCB file(s) which contain the individual water body assessment data, information, etc. upon which the listing decision was made (note: a RWQCB may choose to submit the data assessment information in lieu of the minimum list of files to the SWRCB as part of the submittal package. This may be warranted for some water bodies where there is significant controversy).

G. Coordination with the Watershed Management Initiative (WMI)

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

1. Include the 303(d) listing/review schedule for each watershed in the regions' WMI chapter; and
2. Include the TMDL priority ranking and scheduling in the regions' WMI chapter; and

3. Include resource allocation projections for conducting the 303(d) listing assessment in the regions' WMI chapter; and
4. In cases where the RWQCB focused the 303(d) listing/review on a subset of watersheds in the region, public comments on water bodies outside of targeted watersheds will be directed to the WMI process for prioritization.

Appendix D

Process for TMDL Development

- ◆ **Steps for Developing TMDLs**
- ◆ **Required TMDL Elements**
- ◆ **Selenium TMDL for Salt Slough**

Process for TMDL Development

1. Development of TMDLs

TMDLs in California are developed either by RWQCBs or by USEPA. TMDLs developed by RWQCBs are generally designed as Basin Plan amendments and include implementation provisions. TMDLs developed by USEPA typically contain the total load and load allocations required by Section 303(d), but do not contain comprehensive implementation provisions. This stems from the fact that USEPA authorities related to implementation of nonpoint source pollution control measures are generally limited to education and outreach as provided by CWA Section 319. Authorities under the State Porter Cologne Water Quality Control Act provide broader control responsibilities for nonpoint source pollution control. TMDLs are currently required for all waters and pollutants on the 303(d) list. TMDLs must consider and include allocations to both point sources and nonpoint sources of listed pollutants. Although the abbreviation stands for “Total Maximum Daily Load,” the limitations contained in a TMDL may be other than “daily load” limits (e.g., four-day average). There also can be multiple TMDLs on a particular water body, or there can be one TMDL that addresses numerous pollutants. The basis for grouping is whether or not there can be a common analytical approach to the assessment or a common management response to the impairment.

Steps for Developing TMDLs

The State’s preferred approach in developing TMDLs involves five steps:

- *Involve Stakeholders:* Stakeholders are the general public, land owners/managers, business interests, government entities, environmental groups, regulated community, or anyone concerned with a particular water body. Stakeholders are involved at the beginning of the process in order to provide input to the RWQCBs on the development of TMDLs. Some or all of the stakeholders may ultimately be responsible for implementing the TMDLs.
- *Assess Water Body:* In this step, pollution sources and amounts or “loads” are identified for various times of the year. Then the overall effect of these loads on the water body is determined.
- *Define the Total Load and Develop Allocations:* To ensure water quality objectives are met and beneficial uses are attained, allocations of pollutant load to all sources are established for the pollutant(s) in question. The sum of the allocations must result in the water body attaining the applicable water quality standards. Federal regulations provide that TMDLs can be expressed as mass, thermal energy, toxicity or other appropriate measures. In California, toxicity and other appropriate measures often serve as the basis for TMDLs. As watershed management efforts

mature, it is likely that an increased dependence on measures other than mass or thermal energy will serve as the basis for TMDLs.

- *Develop Implementation Plan:* This step is a description of the approach and activities to be undertaken to ensure the allocations are met and identification of parties responsible for carrying out the actions.
- *Amend the Basin Plan:* State and federal laws requires that TMDLs be incorporated into the Basin Plans. The Basin Plan is a document that describes how an RWQCB would manage water quality. The TMDLs must be formally incorporated into the Basin Plan to be part of the basis for RWQCB actions. Basin Plan amendments are adopted through a public process that requires approval of the TMDLs by the RWQCB, SWRCB, Office of Administrative Law, and USEPA, Region 9, and are codified in State regulations (California Code of Regulations, Title 23)..

TMDL Elements

A complete TMDL must contain all of the following elements in order to be approved by the USEPA:

Problem Statement:

Describes which water quality standards are not being attained, which beneficial uses are impaired, and the nature of the impairment.

Numeric Targets: The Desired Future Condition:

Defines measurements that will ensure recovery of the beneficial uses that are impaired, and attainment of standards. Numeric targets are usually not directly enforceable but are used to assess progress towards the attainment of standards.

Source Analysis:

Identifies the amount, timing, and point of origin of pollutants of concern. Source analysis may be based on field measurements and/or models and estimations.

Allocations:

Allocates responsibility, and identifies the parties to take the specified actions. The allocations may be specific to agencies or persons (businesses), or generally by source category or sector. Allocations of allowable pollutant burdens define TMDL endpoints (e.g., total sediment load from urban runoff). The sum of individual allocations must equal total allowable pollutant burden.

Implementation Plan:

Describes what actions will be undertaken to alleviate the impairments. The Implementation Plan identifies enforceable features (e.g., prohibition) and triggers for RWQCB action (e.g., performance standards).

Linkage Analysis: How the Numeric Targets Relate to the Problem:

Describes how the actions to be taken will result in achievement of the relevant standards.

Monitoring/Reevaluation:

Describes the monitoring strategy that will be used to develop more refined information for performance evaluation and consideration of TMDL revisions, for phased TMDLs.

Margin of Safety:

Describes how the required margin of safety was incorporated into the TMDL. The margin of safety may be implicit (i.e., using conservative assumptions), or explicit (i.e., a discrete allocation assigned to the margin of safety).

This is an example of a final TMDL. The attachments to this TMDL are not included, but will be provided upon request.

Selenium TMDL for Salt Slough

Summary of TMDL Action

TMDL (Loading Capacity)	2 ppb Selenium as a monthly mean
Load Allocation Subsurface Drainage from Drainage Problem Area	2 ppb Selenium as a monthly mean
Waste Load Allocation (no NPDES sources)	0 lbs Selenium

Problem Description

Salt Slough is listed in accordance with Section 303(d) of the Clean Water Act for exceeding selenium water quality objectives. It is one of the principal drainage arteries for the Grassland Watershed in the Western portion of the San Joaquin Valley (Attachment 1). The soils in the watershed are derived from the marine sediments of the Coast Range which are high in salts and selenium. Major land uses in the watershed include agriculture and wildlife refuge wetlands. There are no NPDES permitted sources that drain to Salt Slough.

Dry conditions make irrigation necessary for nearly all crops grown commercially in the watershed. Irrigation of soils derived from marine sediments leaches selenium into the shallow groundwater. Subsurface drainage is produced when farmers drain the salty groundwater from the root zone to protect their crops, and a portion of the Grassland Watershed that generates subsurface drainage has been designated as the Drainage Project Area (DPA). The discharge of subsurface drainage from that area resulted in violations of selenium water quality objectives in Salt Slough and other water bodies within the watershed and downstream. Selenium is a highly bioaccumulative trace element which, under certain conditions, can be mobilized through the food chain and cause both acute and chronic toxicity to fish and wildlife. Deformities and deaths of aquatic birds have been linked to toxic concentrations of selenium.

Salt Slough discharges to the San Joaquin River upstream of the Merced River near the northern boundary of the Grassland watershed. It has undergone dramatic changes in hydrology and water quality due to agricultural development. Prior to September 1996, subsurface drainage from the DPA flowed through the Grassland wetlands and Salt Slough on its way to the San Joaquin River (Attachment 2). There was concern that the elevated selenium concentrations in the subsurface drainage would cause problems for the aquatic

birds and wildlife that utilize the Grassland wetlands. Salt Slough was placed on the Section 303(d) list in 1990 for exceeding the selenium water quality objective established to protect waterfowl and other wildlife uses.

The Clean Water Act mandates that States establish Total Maximum Daily Loads (TMDL) for waterbodies on the Section 303(d) list. The following are the required TMDL elements developed for Salt Slough by the California Regional Water Quality Control Board, Central Valley Region (RWQCB).

Numeric Target

In 1996, the RWQCB adopted a Basin Plan Amendment for the Regulation of Agricultural Subsurface Drainage. The amendment contained a selenium water quality objective for wetlands water supply channels and Salt Slough. This objective, which was approved by the SWRCB and the Office of Administrative Law, is a monthly mean concentration of 2 ppb. It was made more stringent than the selenium objective for other waterbodies to offer added protection to the waterfowl using the wetlands. Based on a review of the available scientific literature, the RWQCB determined that a 2 ppb monthly mean selenium objective would be protective of waterfowl (California Regional Water Quality Control Board, Central Valley Region; 1996; pg. 61).

Consideration was given to translating the selenium water quality objective into a load limit, but water quality data collected in Salt Slough in the late 1980's through early 1990's showed little change in concentration even in response to significant load reductions (California Regional Water Quality Control Board, Central Valley Region; 1995; pp. 5-7). Based on this information, the RWQCB concluded that removal of untreated subsurface agricultural drainage was required to meet water quality objectives (California Regional Water Quality Control Board, Central Valley Region; 1996; pp. 67-68). Therefore, a concentration based objective was determined to be the best measure of success at protecting beneficial uses and achieving water quality improvements. The numeric target for the Salt Slough TMDL is the adopted Basin Plan selenium water quality objective of 2 ppb (monthly mean).

Source Analysis

Although selenium exists naturally in the soils of this watershed, some land use practices accelerate its movement to ground water and surface water. The major components of the historical flow in Salt Slough are subsurface and surface drainage from the DPA and wetlands discharge. Subsurface drainage, specifically from the tile drains in the DPA, is the most significant source of selenium to Salt Slough. Selenium concentrations in tile drainage ranged from 25 to 500 ppb, far above that for the other two components of flow in the Slough. The RWQCB has conducted over a decade of water quality sampling at a site on Salt Slough upstream of historical inputs from the Drainage Problem Area. This site represents background contributions to Salt Slough (i.e., including wetland drainage flows and agricultural return flows outside of the DPA). The median value of selenium was 0.9 ppb and the mean was 1.1 ppb for over 200 samples collected (California Regional

Water Quality Control Board, Central Valley Region; February, 1998; pg. 171). Recent data also shows (attachment 4) that in the absence of agricultural subsurface drainage water from the DPA, concentrations in Salt Slough are under 2 ppb. This data confirms that “background” sources of selenium in Salt Slough are not significant.

Implementation Plan

In 1996, the RWQCB amended its Basin Plan for control of agricultural subsurface drainage discharges. This Basin Plan Amendment prohibits discharge of subsurface drainage water to Salt Slough and the Grassland wetlands if it results in concentrations exceeding the water quality objective, and therefore eliminates the largest loading of selenium to Salt Slough. Since September 1996, tile drainage from the DPA has been rerouted through the Grasslands Bypass Structure which is a portion of the former San Luis Drain and away from the Grassland wetlands on its way to the San Joaquin River (Attachment 3).

The other sources of water to Salt Slough are the wetlands discharge and surface drainage, and groundwater accretion. The selenium concentrations of those sources commonly fall well below 2 ppb, as discussed above; therefore, no implementation provisions are necessary to ensure sources, other than agricultural subsurface drainage from the DPA, remain below the numeric target.

Allocations

Subsurface drainage is prohibited from discharge into Salt Slough if it results in concentrations exceeding the water quality objective; therefore, the subsurface drainage allocation is expressed as the water quality concentration of 2 ppb as a monthly. As discussed in the “Source Analysis” section above, load allocations for the surface drainage and wetlands discharge and groundwater accretion are not necessary since they are not significant sources and are consistently found to be less than 2 ppb.

Performance Measures and Feedback

Monitoring conducted since the use of the Grasslands Bypass Project was initiated indicates that the diversion of the tile drainage away from the Grassland wetlands and Salt Slough has enabled Salt Slough to attain the selenium water quality objective except during the El Niño storm events (Attachment 4). In January 1997, there was one sample with a selenium concentration above 2 ppb, but the monthly mean water quality objective was met. During the El Niño storms in February and March of 1998, the water quality objective was exceeded. During this period, the San Luis Delta-Mendota Water Authority was not able to contain the flood flows and violated the Basin Plan by discharging subsurface drainage into the Grassland wetlands. These violations of the Basin Plan have been addressed by the Water Authority through the development of a storm water management plan.

The RWQCB has monitored selenium levels in waters of the Grassland watershed since 1985. One monitoring station is located in Salt Slough at Lander Avenue. Water quality data including selenium concentration is collected on a weekly basis at this station. Monitoring reports are published monthly and available on the Internet for public review as a part of the Grassland Bypass Project (www.mp.usbr.gov/mp400/irrdn/grasslnd).

RWQCB staff will review the monitoring data and consider revising the TMDL or taking other appropriate action if the numeric target is not met.

Margin of Safety and Seasonal Variation

The Clean Water Act requires that a margin of safety be included with TMDL development. This TMDL incorporates a margin of safety by prohibiting the discharge of subsurface drainage into Salt Slough if it results in selenium concentrations exceeding the water quality objective. The removal of agricultural subsurface drainage from Salt Slough (see discussion in Performance Measures and Feedback) provides the necessary margin of safety to ensure that the numeric target is consistently met. In addition, the removal of agricultural subsurface drainage originating from the DPA should result in average conditions in Salt Slough that are well below the numeric target (see discussion under Source Analysis).

Prior to the 1996 amendments to the Basin Plan, wetland water supplies had generally been protected seasonally during the fall flood-up. The availability of more water for wetland uses meant that such limited, seasonal protection was no longer protective of beneficial uses (California Regional Water Quality Control Board, Central Valley Region; 1996; pp. 9-11). Since waterfowl are most sensitive to selenium and wetland water supplies may now be delivered from Salt Slough to wildlife refuges at any time during the year, there is no seasonal adjustment in the numeric target (which is the water quality objective).

Public Participation

The RWQCB held workshops and public hearings for the 1988 and 1996 Basin Plan Amendments for the Control of Agricultural Subsurface Drainage Discharges. The SWRCB also held approval hearings. The adoption of the Basin Plan Amendment in 1996 enabled the implementation of the Salt Slough TMDL; therefore, the public hearings held for the Amendment will be used to fulfill the public participation requirements of this TMDL. The administrative record for the workshops and public hearings held for the Amendment are on file at the RWQCB in five 3.5 inch binders. The index for the administrative record is included as Attachment 5. The letters received during the comment periods are included in Attachment 6; the responses to the letters and the comments made during the workshops are included in Attachment 7.

This TMDL will be incorporated into the RWQCB's Water Quality Control Plan during the next Basin Plan Update, and Salt Slough will be taken off the Section 303(d) list during the next Section 303(d) update.

References

California Regional Water Quality Control Board, Central Valley Region; 1995. *Staff Report on the Beneficial Uses Designations and Water Quality Criteria to be Use(d) for the Regulation of Agricultural Subsurface Drainage Discharges in the San Joaquin Basin (5c)*; June, 1995.

California Regional Water Quality Control Board, Central Valley Region; 1996; *Amendments to the Water Quality Control Plan for the Sacramento River and San Joaquin River Basins for the Control of Agricultural Subsurface Drainage Discharges*; Staff Report; March, 1996.

California Regional Water Quality Control Board, Central Valley Region; 1998; *Compilation of Electrical Conductivity, Boron, and Selenium Water Quality Data for the Grassland Watershed and San Joaquin River; May 1985-September 1995*; February, 1998.

Appendix E

**Regional Water Quality Control Board
TMDL Schedule (November 2000)**

RWQCB TMDL Schedule (November, 2000)							
Region	Water Body	Stressor	Started 2000 or earlier	TMDL Completed	Due for completion FY 00-01	Due for completion FY 01-02	Technical report to be completed
1	Navarro River	Sediment	X		X		X
1	Navarro River	Temperature	X		X		X
1	Gualala River	Sediment	X			X	X
1	Big River	Sediment	X			X	X
1	Mattole River	Sediment	X			X	X
1	Mattole River	Temperature	X				X
1	Trinity River (Upper)	Sediment	X				
1	Trinity River (Middle)	Sediment	X			X	
1	Trinity River (Lower)	Sediment	X			X	
1	Albion River	Sediment	X			X	
1	Ten Mile River	Sediment	X			X	
1	Eel River	Sediment	X			X	
1	Eel River	Temperature	X				
1	Redwood Creek	Sediment	X			X	X
1	Trinity (South Fork)	Sediment	X			X	
1	Van Duzen River	Sediment	X			X	
1	Noyo River	Sediment	X		X		X
1	Garcia River	Sediment	X		X		X
1	Laguna de Santa Rosa	Nitrate	X	X			
2	S.F. Bay	Mercury	X			X	
2	S.F. Bay	PCBs	X				
2	S.F. Bay	Copper	X				
2	S.F. Bay	Nickel	X				
2	Urban Creeks	Diazinon	X				
2	Tomaes Bay	Pathogens	X				
2	Napa River	Siltation	X				
2	San Francisquito Creek	Siltation	X				
2	South SF Bay	Copper	X			X	
2	South SF Bay	Nickel	X			X	
2	Guadalupe River Watershed	Mercury	X				
2	Regionwide Creeks	Siltation	X				
3	Chorro Creek	Metals	X			X	
3	Morro Bay	Nutrients	X		X		X
3	Morro Bay	Pathogens	X			X	
3	Morro Bay	Priority Pollutants	X				X

RWQCB TMDL Schedule (November, 2000)							
Region	Water Body	Stressor	Started 2000 or earlier	TMDL Completed	Due for completion FY 00-01	Due for completion FY 01-02	Technical report to be completed

3	Morro Bay	Siltation	X		X		X
3	Pajaro River	Nutrients	X				X
3	Pajaro River	Siltation	X				
3	Salinas River	Siltation	X				X
3	San Lorenzo River	Nutrients	X		X		X
3	San Lorenzo River	Pathogens					X
3	San Lorenzo River	Siltation	X			X	
3	San Luis Obispo Creek	Nutrients	X				X
3	San Luis Obispo Creek	Pathogens	X				X
3	San Luis Obispo Creek	Priority Pollutants	X				X
3	Valencia Creek and Aptos Creek	Siltation					X
3	Watsonville Slough	Oil and Grease	X				
3	Watsonville Slough	Pesticides	X				
4	San Gabriel East Fork	Trash	X		X		
4	Santa Clara River	Chloride	X		X		
4	Ballona Creek	Trash	X			X	
4	L.A. River Trash	Trash	X		X		
4	Calleguas Creek	Chloride	X		X		
4	Malibu	Coliform	X			X	
4	Malibu	Nutrients	X			X	
4	L.A. River	Coliform	X			X	
4	L.A. River	Nutrients	X			X	
4	Ballona Creek	Coliform	X			X	
4	Santa Monica Beaches	Coliform	X			X	
4	Calleguas Creek	Nutrients	X			X	
4	Dominguez Channel	Coliform	X			X	
4	L.A. River	Metals	X				
4	McGrath Beach	Coliform	X				
4	San Gabriel	Nutrients	X				
5	Cache Creek	Hg	X				
5	Delta	Hg	X				
5	Lower Sacramento	Diazinon	X				
5	Lower Feather	Diazinon	X				
5	San Joaquin River	Diazinon	X				
5	San Joaquin River	Chlorpyrifos	X				

RWQCB TMDL Schedule (November, 2000)							
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5	Delta	Diazinon	X				
5	Delta	Chlorpyrifos	X				
5	Upper Sacramento River	Copper	X				
5	San Joaquin River	Salt and Boron	X		X		X
5	San Joaquin River	Selenium	X		X		X
5	San Joaquin River	DO	X				
5	Salt Slough	Selenium	X	X			
5	Grasslands	Selenium	X	X			
5	Arcade Creek	Diazinon	X				
5	Urban Creeks	Diazinon	X				
6	Squaw Creek	Sediment	X				
6	Truckee River	Sediment	X				
6	Blackwood Creek	Sediment	X				
6	Bridgeport Reservoir	Nutrients	X				
6	Crowley Lake	Nutrients	X				
6	Haiwee Reservoir	Copper	X			X	
6	Heavenly Valley Creek	Sediment	X		X		
6	Indian Creek Reservoir	Phosphorus	X		X		
6	Pine Creek	Fish habitat impairment	X		X		
6	Lake Tahoe	Sediment & Nutrients	X				
6	Monitor Creek	Metals	X				
6	Upper Owens River	Riparian Habitat Impairment	X				
6	Lower Owens River	Flow alteration	X				
7	Alamo River	Sediment	X				
7	New River	Bacteria	X			X	
7	New River	Sediment	X			X	
7	Alamo River	Selenium	X				
7	Salton Sea	Nutrients	X				
8	Upper Newport	siltation	X	X			
8	San Diego Cr., R1,R2	siltation	X	X			
8	Lower Newport	nutrients(1)	X	X			
8	Upper Newport	nutrients	X	X			
8	San Diego Cr., R1,R2	nutrients	X	X			
8	Lower Newport	pathogens(1)	X	X			

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8	Upper Newport	pathogens	X	X			
8	Newport/San Diego Creek	phosphorus	X	X			
8	Lower Newport	toxics(2)	X			X	
8	Upper Newport	toxics(2)	X			X	
8	San Diego Cr., R1,R2	toxics(2)	X			X	
8	Mill Creek	pathogens	X				
8	Mill Creek	nutrients	X				
8	Mill Creek	suspended solids	X				
8	Big Bear Lake	metals	X				
8	Big Bear Lake	nutrients	X				
8	Big Bear Lake	siltation	X				
8	Knickerbocker Cr.	pathogens	X				
8	Lake Elsinore/Canyon Lake	nutrients	X				
8	Lake Elsinore	siltation	X				
8	Lake Elsinore	unk. toxicity (2)	X				
8	Lake Elsinore	pathogens	X				
8	Santa Ana River	nutrients	X	X			
9	Chollas Creek	Diazinon	X			X	
9	Rainbow Creek	Nutrients	X		X		
9	Chollas Creek	Metals	X				
9	San Diego Bay; Shelter Island Yacht Basin	Dissolved Copper	X				
9	San Diego Bay; Near Chollas Creek	Benthic community degradation, Toxicity	X				
9	San Diego Bay; Seventh Street Channel	Benthic community degradation, Toxicity	X				
9	San Diego Bay; San Diego Bay Naval Station	Benthic community degradation, Toxicity	X				
9	San Diego Bay; North of 24th Street Marine Terminal	Benthic community degradation, Toxicity	X				
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