> standard for purposes of the Act until EPA withdraws the Federal water quality standard.[2] (40 C.F.R. 131.21(c).)

Under its own terms, the Alaska Rule only applies to new or revised water quality standards. The definition of "water quality standards", therefore, dictates the scope of the Alaska Rule.

The federal regulations define water quality standards in two locations. 40 Code of Federal Regulations sections 131.6(a), (c), and (d) require that water quality standards, in addition to specific supporting material, must include at least the following:

- ?? Use designations (beneficial uses)
- ?? Water quality criteria (water quality objectives)
- ?? An antidegradation policy

To this list, 40 Code of Federal Regulations section 131.13 adds certain policies related to these standards:

> States may, at their discretion, include in their State standards, policies generally affecting their application and implementation, such as mixing zones, low flows, and variances. Such policies are subject to EPA review and approval.

While section 131.13 of the federal regulations does not itself require prior approval of such policies, the regulation does state that such policies would be part of a state's standards. Accordingly, CWA section 303(c)(3) would apply, as would the Alaska Rule, to any such "policies" that "generally affect" the "application and implementation" of standards. (40 C.F.R § 131.13.) Consistent with the above, EPA, Region IX, recently articulated with respect to the Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California (2000), that within the gambit of section 131.13 fall policies relating the application and implementation of priority pollutant criteria and objectives, mixing zones and dilution credits, compliance schedules, site-specific objectives, and exceptions (variances). (Letter from Alexis Strauss to Edward Anton, dtd. 5/1/01, pp. 2-3.)

B. TMDLS Are Not Policies As Referenced In Section 131.13

TMDLs are not policies, as referenced in section 131.13. This conclusion is drawn from the principal that while EPA has the authority to define the term "water quality standards," and to include certain types of policies in that definition, EPA's regulations implement the CWA and thus cannot be read in a manner inconsistent with the CWA itself. If a TMDL were deemed a policy under section 131.13, an irreconcilable conflict would exist between CWA sections 303(c)(3) and 303(d)(2). The former statute would require the TMDL to be approved

[2] Notably, EPA has stated that it would not object to an NPDES permit that implements a proposed, but as yet unapproved, more stringent standard, provided the NPDES permit assures compliance with the existing approved water quality standards as well. (65 F.R. at 24644.)

within 60 days (before it could be effective) or disapproved within 90 days. The latter statute, however, requires the TMDL to be approved or disapproved within 30 days:

> Each State shall submit to the Administrator. . .for his approval the. . .loads established under [section 303(d)(1)]. The Administrator shall either approve or disapprove such. . .load not later than thirty days after the date of submission. If the Administrator approves such. . .load, such State shall incorporate [it] into its current [water quality control plan]. If the Administrator disapproves such . .load, he shall not later than thirty days after the date of such disapproval. . .establish such loads for such waters as he determines necessary to implement the [applicable water quality standards] and the State shall incorporate them into its current [water quality control plan]. (33 U.S.C. § 1313(d)(2).)

Since the legislature enacted a separate approval process for TMDLs in section 303(d)(2), EPA's regulations cannot be read to require that TMDLs be approved under the conflicting provisions of section 303(c)(3). Plainly the regulations cannot regard entire TMDLs as policies subject to section 131.13. The Legislature thus did not intend TMDLs to be deemed water quality standards, and EPA's regulations at section 131.13 cannot be interpreted to the contrary.

This same reasoning would prevent dissecting a TMDL's primary elements and deeming one or more of them to individually be standards. A TMDL in its base form is the total load, load (and waste load) allocations, and the margin of safety. Creation of these parts of the TMDL, and EPA's approval authority, emanate from section 303(d)(2), not from section 303(c)(3).

Finally, neither can a TMDL's implementation plan be deemed a water quality standard under 40 Code of Federal Regulations section 131.13. Section 131.13 regards as water quality standards "policies generally affecting" water quality standards' "application and implementation." (40 C.F.R. 131.13.) A TMDL implementation plan, however, does not so qualify, for at least three reasons. First, the implementation plan is not a policy. It is a plan or a program. Second, the implementation plan does not "generally affect" the application or implementation of water quality standards, as do policies relating to mixing zones, low flows, or variances. (See 40 C.F.R. 131.13.) To the contrary, a TMDL implementation plan "specifically affects" the implementation of specific standards in specific water segments. Finally, section 131.13 requires for the policy to be deemed a water quality standard, that the state include the policy as part of its state standards: "States may. . .include in their State standards." (*Id.* (emphasis added).) The TMDL implementation plan, however, is not adopted in as part of California's state standards but as part of its TMDL. Whatever federal law may ultimately require TMDLs to include the implementation plan is a function of California law attendant with the responsibilities imposed by CWA section 303(d). (See Wat. C § 13050(j)(3); Memorandum from William R. Attwater, Chief Counsel, to Gerard Thibeault, dtd. 3/1/99.) The plan is

therefore not a part of California's water quality standards (section 303(c)), but a part of California's TMDLs (section 303(d).)[3]

C. Notwithstanding The Above, Any Part Of A TMDL That Adopts Or Revises A Water Quality Standard Requires Prior EPA Approval Under The Alaska Rule

Although entire TMDLs, their primary elements, and their implementation plans are not water quality standards, in some instances other parts of a California TMDL may be standards subject to section 303(c)(3), and thus the Alaska Rule. If a TMDL implementation plan adopts a site-specific water quality objective, revises a beneficial use, or creates a mixing zone policy, for instance, clearly any of these provisions would be standards, and require prior approval pursuant to the Alaska Rule.

Other parts of a TMDL, however, plainly are not standards. Of the other standard TMDL elements in California, most are not policies and most do not generally affect the application and implementation of standards. The problem statement, source analysis, and linkage analysis, for example, are analyses and do not implicate section 131.13. Nor, for that matter, does the numeric target. The numeric target is an implementation tool used to translate existing standards (objectives or beneficial uses) and measure progress toward attainment. The numeric target does not amend or create new objectives or uses. Pursuant to the Alaska Rule, EPA already approved the existing objectives or uses when the standard was adopted.

The key inquiry is whether the basin plan amendment adopts or modifies a beneficial use or water quality objective. Furthermore, if the amendment establishes a policy as a part of state standards, that generally affects the application and implementation of the standards, then it too, falls within the purview of the Alaska Rule. However, such policies must be distinguished from plans or programs to attain or implement specific standards in specific water bodies.

D. Lack Of Application Of The Alaska Rule Does Not Deprive EPA Its Authority And Responsibility To Review And Approve Other Matters That Are Not The Adoption Or Revision Of Standards

The fact that the Alaska Rule does not apply to most parts of most TMDLs does not imply that EPA lacks any reviewing authority. The Alaska Rule only respects prior approval by EPA. EPA approval of TMDLs is nonetheless required, but prior approval is not. California's TMDLs (except any parts that revise standards), are immediately valid upon approval under California

[3] Considerable consternation across the country continues to plague the federal TMDL program. Not the least of these debates revolves around EPA's legal authority to require implementation plans for TMDLs. The new TMDL rule had required an implementation plan to be submitted with each TMDL. (65 F.R. 43586, 43668 (7/13/2000).) However, EPA postponed implementation of that rule until at least April 30, 2003. (66 F.R. 53043, 53044 (10/18/2001).) In any event, EPA also apparently considers the implementation plan to be part of a TMDL and not part of a water quality standard.

law, and may be implemented immediately. If EPA disapproves a TMDL, section 303(d)(2) requires EPA, within 30 days, to "establish such loads for such waters as [are] necessary to implement the [applicable] water quality standards." (33 U.S.C. § 1313(d)(2).) The state would thereafter be required to adopt into its applicable basin plan whatever TMDL EPA had promulgated. (*Id.*; 40 C.F.R. 130.7(d)(2).) In this respect, the state's disapproved TMDL would not be *per se* invalid. It would only be invalid to the extent it was superseded by EPA's TMDL. (33 U.S.C. § 1370.) The remainder of the TMDL's requirements would continue to have full force of law, under California's Porter-Cologne authority.

CONCLUSION

Under the Alaska Rule, EPA must approve water quality standards for waters of the United States before they are effective. While water quality standards can include certain policies generally affecting standards application and implementation, such policies are but a subset of potential state actions relating to standards. While each TMDL must be submitted to EPA for approval, unlike the standards section (CWA section 303(c)(3)) CWA section 303(d)(2) does not require approval of TMDLs as a condition precedent to enforceability. Accordingly, every part of a TMDL, except adoption of a new or revised water quality standard, is enforceable under California law, immediately upon promulgation under California law.

While some TMDLs presented to the State Board have contained a condition establishing the effective date of the TMDL to be the date upon which it is approved by EPA, such a condition is not required as a matter of state or federal law, and should be used only when it is actually the desire of the Regional Water Quality Control Board to do.

Should you have any questions about this memorandum, please contact Staff Counsel Michael J. Levy at (916) 341-5193.

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TO: Arthur G. Baggett, Jr.
Chair

/ s /

FROM: Craig M. Wilson
Chief Counsel
OFFICE OF CHIEF COUNSEL

DATE: October 16, 2001

SUBJECT: LEGAL AUTHORITY FOR OFFSETS, POLLUTANT TRADING, AND MARKET PROGRAMS TO SUPPLEMENT WATER QUALITY REGULATION IN CALIFORNIA'S IMPAIRED WATERS

I. Introduction

This memorandum has been prepared to outline the existing legal authority to employ offsets, pollutant trading, and other market programs to supplement water quality regulation in impaired waters. While there is no fixed definition of these terms, "offsets" generally refer to unilateral abatement efforts by a discharger to remove a certain amount of pollutant discharge from existing sources to compensate for the discharger's own discharge. "Pollutant trading" generally refers to an exchange of either permitted discharge levels or required abatement levels between two or more dischargers, either in a formal "commodities" market or banking system, or a less structured exchange.

In sum, the extent to which such mechanisms may be employed varies greatly depending upon whether a TMDL has been adopted for the impaired water, although they may be permissible in either context. The analysis in this memorandum is equally applicable for any market-type mechanism, be it offsets, pollutant trading, or another analogous system that would authorize one discharger to perform (or to encourage another to perform) additional abatement or restoration in lieu of meeting an otherwise applicable or more stringent discharge limitation or prohibition.

This memorandum should not be construed as delineating the universe of possible market-scenarios that may be legal in given circumstances. Each such system must be evaluated in the context of its own circumstance. However, this document is intended to discuss some of the legal issues that will arise in considering such systems. These include at least the anti-

backsliding rule, and the extent to which the regulations authorize new or renewed permits to be issued for discharges into impaired waters.

In considering any of these approaches, Regional Water Quality Control Boards (Regional Boards) should be cognizant of the state's legal obligation to adopt and implement approximately 1400 TMDLs. Accordingly, any market system should only be contemplated under circumstances that will promote (and not forestall) TMDL development or attainment of water quality standards.

II. Irrespective of whether a TMDL exists, federal law requires each point source to be subject to applicable technology based effluent limitations (TBELs) as a floor.

Section 402(b) of the CWA requires that all NPDES permits issued by California contain applicable TBELs. (33 U.S.C. § 1342(b)(1)(A). See also 33 U.S.C. §§ 1311, 1313(e)(3)(A).) Effluent limitations based upon the best available technology are the floor and the minimum that must be required of any NPDES permitted discharge. Thus, no market system can be adopted that would afford relief from TBELs in NPDES permits, for either new or existing sources.

III. When a TMDL is in place, the Clean Water Act (CWA) and California law give wide latitude to develop creative means of achieving compliance with water quality standards (WQS), subject to certain limitations.

A. The water quality based effluent limitations (WQBELs) applicable to new or existing point sources can be adjusted in compliance with a TMDL.

NPDES permits must also incorporate "any requirements in addition to or more stringent than [TBELs] necessary to . . . [a]chieve water quality standards." (44 C.F.R. § 122.44(d)(1).) See also 33 USC §§ 1342(b), 1311(b)(1)(C).) Unlike TBELs, these water quality based effluent limitations (WQBELs) can be adjusted in contemplation of a TMDL. While the CWA's anti-backsliding provisions would ordinarily prohibit the state from permitting a less stringent effluent limitation, section 402(o) contains an express exception applicable when a TMDL is in place. (33 U.S.C. § 1342(o).) Specifically, if the water is impaired, existing WQBELs may be relaxed if "the cumulative effect of all such revised effluent limitations based on such [TMDL] or waste load allocation will assure attainment of such [WQS]." (33 U.S.C. § 1313(d)(4)(A).)

Federal regulations bolster these provisions. Under the regulations, WQBELs must be "consistent with the assumptions and requirements of any available wasteload allocation . . . ." (40 C.F.R. § 122.44(d)(1)(vii)(B).) The regulations do not require WQBELs to be "equivalent to" available waste load allocations. Accordingly, so long as the cumulative effect of all WQBELs assures attainment of WQS, hence the assumptions of the TMDL, WQBELs can be adjusted based upon whatever mechanisms the state determines is appropriate.

This regulatory structure is equally applicable to new sources. A WQBEL that otherwise would be applicable to a new source can also be adjusted based upon a TMDL, whether through the use of offsets or other appropriate measures, that insure attainment of WQS. The CWA's anti-backsliding provisions do not apply to new dischargers.

To avoid a claim that a given NPDES permit is inconsistent with a TMDL, if any such mechanisms are contemplated, it would be appropriate to incorporate pertinent details of the market-based provisions into the TMDL implementation plan. If sufficient details of potential market approaches are not known at the time the implementation plan is adopted, alternatively, Regional Boards can retain flexibility in translating WLAs into effluent limitations by articulating a provision similar to the following in the implementation plan:

> "While individual WQBELs shall be consistent with the assumptions and requirements of the available WLAs, LAs, and the TMDL, individual WQBELs need not be equivalent to corresponding allocations so long as the cumulative effect of all WQBELs assures attainment of WQS as quantified by the TMDL. (33 U.S.C. § 1313(d)(4)(A); 40 C.F.R. § 122.44(d)(1)(vii)(B).)"

Although failure to include the above language would not necessarily preclude subsequent flexibility in implementation, the better practice, given the public-participation requirements, would be to minimize surprises by disclosing up front that alternative attainment mechanisms may be employed.

Nonpoint Source Discharges

TMDLs must identify and grant allocations to all sources of pollution, including load allocations to nonpoint sources. The TMDLs therefore may disclose nonpoint sources as likely candidates to be offsets for point sources in addition to or apart from other point-source abatement. In appropriate circumstances, i.e., where load reductions can be calculated and enforceable, offsets may also be applied for the benefit of nonpoint sources as well as point sources.

Since the CWA does not directly regulate nonpoint sources, such discharges are subject to applicable limitations set forth under state law. California's primary mechanism to protect water quality for non-NPDES discharges (be they nonpoint source, or point source discharges to non-navigable waters) is through issuance of waste discharge requirements (WDRs) under Water Code section 13263. The extent to which offsets can be used in this context is derived from the state's authority to issue WDRs generally. Specifically:

> The requirements [for waste discharge] shall implement any relevant water quality control plans that have been adopted, and shall take into consideration the beneficial uses to be protected, the water quality objectives reasonably required for that purpose, other waste discharges, the need to prevent nuisance, and the

> provisions of Section 13241 [dictating matter to be considered in establishing water quality objectives]. (Water Code § 13263(a).)

Section 13241 in turn requires consideration of, among other things, "[w]ater quality conditions that could reasonably be achieved through the coordinated control of all factors which affect water quality in the area." (Water Code § 13241(c).)

Since the basin plans protect beneficial uses and articulate water quality objectives, any WDRs issued must be protective of those uses and meet the objectives. Notably, the Regional Boards are authorized (1) to not utilize the full waste assimilation capacities of the receiving waters and (2) to utilize time schedules if they determine them appropriate in their discretion. (Water Code § 13263(b) and (c).) These authorizations may be further elucidated upon or restricted in a region's applicable basin plan. Moreover, given Section 13241(c) of the Water Code, it would be appropriate in establishing WDRs for a particular discharger to consider the affect that other pollution control measures in the area could have on the water body. So long as such other measures are implemented, and the cumulative effect of such measures and the discharge meet water quality objectives, the level of abatement required in the WDRs could be adjusted accordingly.

Traditionally, California's nonpoint sources have been regulated through general WDRs or general waivers of WDRs. Waivers of WDRs are subject to the restriction that the waiver not be "against the public interest." (Water Code § 13269(a).) In its Nonpoint Source Management Plan, the state has committed to controlling nonpoint source pollution through a three-tiered approach, rather than though immediate issuance of individual WDRs. First, it will encourage self-determined pollution abatement measures. Second, it will employ regulatory incentives to achieve the desired results. Third, if the other tiers are unsuccessful, the state will issue WDRs to nonpoint source dischargers or use other direct regulatory mechanisms. (Nonpoint Source Program Strategy and Implementation Plan, 1998-2013 (PROSIP) pp. 54-60.)

The second tier is exceptionally amenable to use of conditional waivers of WDRs. Participation in an offset program that is part of a water quality attainment strategy (such as a TMDL) could be a proper condition upon which WDRs could be waived. Since the offset is part of a water quality attainment strategy, it would presumably not be against the public interest. Notably, the authority to waive WDRs is qualified by the provision that the Regional Boards must "require compliance with the conditions pursuant to which waivers are granted under this section." (Water Code § 13269(e).) It would also be permissible to incorporate an offset as a requirement in WDRs themselves, for the same purposes as set forth above.

IV. In the absence of a TMDL, offsets must be consistent with the regulations that require all discharge permits to implement WQS.

A degree of uncertainty exists about the U.S. Environmental Protection Agency's (EPA) position on whether offsets are appropriate in the absence of a TMDL. EPA proposed an offset program that was published in the Federal Register on August 23, 1999. That program would have allowed new discharges in the absence of a TMDL, provided the new discharge and offset together demonstrated "reasonable further progress" toward attainment, and therefore did not violate the antidegradation rules. At least a 1.5 to 1 offset ratio was determined to generally constitute reasonable further progress. On July 13, 2000, however, EPA published its abandonment of the rules that would have implemented the program. Notably, the program was not abandoned for illegality, but because EPA determined its offset requirement, as proposed, was not the best mechanism to achieve progress in impaired waters in the absence of a TMDL, especially given the existing regulations set forth at 40 Code of Federal Regulations (C.F.R.) sections 122.4(d)(1)(vii), and 122.4(i).

EPA's findings were directed to the utility of a nationwide fixed offset policy, and do not necessarily imply that EPA is opposed to offsets in any given or all circumstances. In fact, there are several prominent indications to the contrary. (See e.g., Draft Framework for Watershed-Based Trading, U.S. EPA Office of Water, EPA 800-R-96-001 (May, 1996); EPA Region 9 Draft Guidance for Permitting Discharges into Impaired Waterbodies in Absence of a TMDL (5/9/00).[1]) Given that no statutes or regulations directly address market-approaches to water quality regulation, any such programs must be examined within the confines of the existing regulatory structure.

New Sources: An NPDES permit cannot be issued to a new source if it would "cause or contribute" to a violation of WQS. In appropriate circumstances, however, a new discharge, coupled with an offset, might be deemed to not "cause or contribute" if the new discharge is not merely a substitute contributing source of pollution for the offset.

The NPDES regulations prohibit new discharges that would contribute to a violation of WQS:

> No permit may be issued ... [¶ to] a new source or a new discharger, if the discharge from its construction or operation will cause or contribute to the violation of water quality standards. (40 C.F.R. § 122.4(i).)[2]

[1] Note: Since these are draft documents, they should not be relied upon as reliable authority for any position. Their inclusion here is exclusively for illustrative purposes only.

[2] Notably, this regulation is also qualified when a TMDL is in place, and requires the discharger to undertake a load assessment to demonstrate that additional assimilative capacity exists to allow the discharge. (40 C.F.R. § 122.4(i).)

While this language could be interpreted as prohibiting all new discharges into impaired waters without a TMDL, neither the U.S. Supreme Court nor EPA have adopted that position. (See *Arkansas v. Oklahoma* (1992) 503 U.S. 91, 107-108, but see *In The Matter of: Mayaguez Regional Sewage Treatment Plant Puerto Rico Aqueduct and Sewer Authority* (1993) 4 E.A.D. 772, fn. 21 [limiting *Arkansas* to its facts]. See also 65 Fed.Reg. 23640 col. 3.)[3] In fact, it can properly be argued that a new discharge does not "cause or contribute" if coupled with an appropriate offset.

Determining whether a new discharge, coupled with an offset, will "cause or contribute to" the violation of WQS involves a degree of factual analysis, and a degree of interpretation. If a new discharger, for instance, were to propose a one-to-one mass offset from other dischargers (be they existing point or nonpoint sources) for the discharger's increased waste load, the discharge would involve merely the substitution of one contributing source of impairment for another. A new contributing source that substitutes for an existing contributing source is still a contributing source. As such, a one-for-one offset scenario would probably be prohibited by the federal regulations.

Likewise, offsets in a venue remote to the proposed discharge would not offset the impairment-contribution from a new discharge, as the offset program would not yield benefits to the relevant water quality limited segment. Such a new discharge would merely be an additional contributing source of impairment. Again, this would appear to be prohibited by the same authorities.

On the other hand, if a discharger performs offsets greater than one-to-one, in a venue relevant to the new discharge, it may well properly be deemed to not "cause or contribute" to the impairment. In such circumstances, the net result is actually to improve water quality.

Given the regulatory prohibition against contributing to excursions above objectives, in the absence of a TMDL benchmark, the safest offsets would involve projects whose relevance to attainment of WQS should be apparent. Accordingly, if a new discharger were to instigate, for example, a legacy-abatement program, especially if such a program was probably necessary to attainment but would not readily be accomplished were it not for the efforts of the new discharger, a good argument would be apparent that the offset is not merely a substitute for an existing contributing source. If the legacy abatement efforts created significant quantifiable mass abatement above and beyond the new discharge, the cumulative effect of the discharge and offset can properly be viewed as improving water quality. Likewise, if a new source cannot meet concentration-based effluent limitations, an offset that achieved a sufficient reduction in background levels might fall within this category as it could provide room for dilution that might not otherwise be available.

[3] Though not relevant to the subject of this memorandum, an obvious flaw in the no-discharge position is the fact that discharges meeting criteria end-of-pipe necessarily do not contribute to excursions above criteria.

The variable in the above analysis, however, is the lack of knowledge of the relevance of the offset to the water's impaired status. Without such knowledge, it may often be difficult to determine whether the improvement from the offset will be sufficient to defensibly reach the conclusion that the discharge is not merely a substitute cause of impairment. Any offset program in the absence of a TMDL will therefore be subject to significant scrutiny, and its defensibility in the absence of knowledge of the TMDL benchmark values, will be fact-specific, and will include an evaluation of numerous factors. These will no doubt include at least an evaluation of the substantiality of the offset achieved in exchange for the discharge (offset-ratio), as well the level of certainty that the offset program will abate a sum-certain of contributing pollutants. The inquiry may properly also include a consideration of the likelihood that the source to be offset would or could be abated through other means (the less likely the source is to be abated through other means, the more compelling the need to find alternative incentives to abate it) and whether the offset generates a permanent or temporal abatement. In any event, where a definitive improvement in water quality can be shown, such offsets ought to be encouraged.

The key legal point is that since federal law prohibits new discharges that cause or contribute to violations of water quality standards, to be defensible, any offset program must do more than substitute one contributing source for another. The program should significantly drive the watershed toward attainment or otherwise toward development of a TMDL. The key practical point is that an offset program in the absence of a TMDL should be chosen carefully to maximize the chances that a reviewing court (one that may be ideologically opposed to offsets) will find the facts compelling enough to sustain despite any skepticism.

Legacy-abatement and watershed-restoration efforts, for example, seem particularly amenable to pre-TMDL circumstances for the reasons set forth above. Such efforts may yield permanent benefits to the watershed in exchange for a temporal discharge. These offsets do not merely substitute one source for another, but create assimilative capacity through improvements to the overall environmental health of the watershed. In many cases, such efforts may ultimately need to be undertaken as part of a TMDL implementation plan in any event. Accordingly, rather than forestalling TMDL development and implementation, offsets of this nature may promote the state's performance of its TMDL obligations, and may do so in advance of formal TMDL implementation.

Existing Sources: Whether offsets can be used to allow relief from an otherwise applicable WQBEL, without a TMDL, depends upon whether the anti-backsliding rules apply, and if not, whether the discharge is protective of WQS.

1. Anti-backsliding

A key distinction between new and existing sources is the anti-backsliding rule. The anti-backsliding rule provides that, unless certain exceptions are met:

> [A] permit may not be renewed, reissued, or modified . . . subsequent to the original issuance of such permit, to contain effluent limitations which are less stringent than the comparable effluent limitations in the previous permit except in compliance with section 1313(d)(4) of this title. (33 U.S.C. § 1342(o).)

Since an offset program by definition provides a discharger with an avenue to obtain flexibility in lieu of the application of an otherwise stringent effluent limitation, the extent to which the anti-backsliding rule applies could have significant consequences in terms of the permissibility of offsets. However, there are many circumstances in which the anti-backsliding rule does not apply.[4] The most notable of these is the limitation that the rule only applies to the "comparable effluent limitations in the previous permit." (*Id.*)

In SWRCB Order WQ 2001-06 (The Tosco Order), the State Water Resources Control Board (State Board) addressed the question of whether effluent limitations in interim permits—permits reissued prior to the adoption of a TMDL—are "comparable effluent limitations" to those in the previous permit. The Tosco Order held that the discharger's interim performance-based effluent limitation, in a compliance schedule, was not a comparable effluent limitation to that set forth in its final limit from the previous permit. The State Board reached this result for two reasons. First, the interim limit at issue was a performance-based effluent limitation, which was issued pursuant to a compliance schedule that was authorized under the applicable Regional Water Quality Control Plan. Such interim limits, the State Board held, are not designed to attain water quality, but to preserve the status quo during the term of the compliance schedule. Furthermore, if the anti-backsliding rule were deemed to apply to such limits, it would effectively prohibit compliance schedules. (Order WQ 2001-06, pp. 51-52.) Since the previously permitted final effluent limitation was a WQBEL, and the interim limitation was performance based, the two effluent limitations were not "comparable" as they were not derived with the same considerations in mind. Instead, the "comparable limit," the State Board held, would be the alternative final (water quality based) limit, not the interim (performance based) limit. Since the two effluent limits were not comparable, the fact that the interim limit was less stringent than the previous final effluent limit did not violate the anti-backsliding rule.[5]

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[4] 33 U.S.C. section 1342(o)(2) contains five exceptions to the anti-backsliding rule, that may render it inapplicable to a given discharge. While these are not discussed separately in this memorandum, if any of these exceptions apply, the analysis that follows would also apply.

[5] This theory would apply whenever a compliance schedule may authorize an interim discharge in excess of limits established in a prior permit. Other authorities provide for compliance schedules in appropriate, instances, most notably, EPA's California Toxics Rule (CTR) and the state's policy that implements it, authorizes a compliance schedule as to CTR criteria pollutants when a discharger shows that immediate compliance with criteria is infeasible, and the discharger had committed to support and expedite development of a TMDL. (Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California § 2.1.1 (2000).)

This finding has been challenged by a writ petition to the superior court. In that proceeding, the petitioner contends the term "comparable limit" refers to the permitted levels of pollutant discharge, not to the way the levels were derived. If the petitioners prevail, there will be far less permitting flexibility for interim permitting of existing facilities. Assuming the State Board's finding is affirmed, however, those regions whose applicable water quality control plans authorize compliance schedules may, if they choose, adopt offset requirements in conjunction with an interim permittee's compliance schedule. In cases where the interim limit is deemed comparable to the previous limit (be it on the basis of the Tosco reasoning or a subsequent judicial interpretation), section 402(o) may be an impediment to relaxing the effluent limitation to accommodate an offset in the absence of a TMDL.

2. Potential situations where the anti-backsliding rule may not apply

a. Bubbling of NPDES permitted sources

In the 1970s, the U.S. EPA endorsed permit "bubbling" for stationary sources subject to the federal Clean Air Act. Bubbling entailed treating multiple sources as though they were a single source, with an aggregate emissions limit. Since there was a total limit based on the bubble output, the individual sources within a given bubble could allocate the emissions amongst themselves, provided the sum of all emissions did not exceed the bubble limitation. This concept is similar to the mechanisms employed by the Grassland Bypass Project, which controls selenium in nonpoint source agricultural discharges to levels sufficiently protective that the San Luis Drain could be reopened. The San Luis Drain is treated as one outfall for purposes of the Project. As long as the Drain output attains standards, the dischargers may determine for themselves who may discharge what amount.

As noted, anti-backsliding applies only to "comparable effluent limitations in the previous permit." Nothing in the Clean Water Act prohibits issuing a single NPDES permit that regulates several sources. Certainly the limitations set forth in such a super-permit are not "comparable" to prior limitations imposed on individual sources now subject to the super-permit. At most all that could be said is that the super-permit is comparable to the totality of all the super-permittees' individual permits. Thus while such a super-permit could not properly expand the universe of what was individually permissible by the collective, individuals should not be deemed to backslide if the total output of the bubble does not exceed the cumulative total of the individuals. Of course, when using any bubbling mechanism, care must be taken to insure criteria are attained at all points within the bubble. A market system cannot authorize participants to discharge in a manner that would cause or contribute to excursions above criteria. (40 C.F.R. § 122.4(i); 40 C.F.R. § 122.44(d)(1)(vii)(A).)

b. Mini- or Partial TMDL

Although a TMDL may not have been created, often the major sources of impairment are well known. Frequently, abatement of these sources may be regarded as essential to any TMDL implementation plan even though such a plan is not yet being developed. Under such circumstances, it may be possible to create a mini- or partial TMDL that assigns preliminary LAs or WLAs to dischargers who undertake or participate in abatement of these sources in advance of the final TMDL. Since these LAs or WLAs would be assigned in exchange for abatement necessary to the success of the ultimate TMDL, they are plainly either "based on a [TMDL] or other waste load allocation." (33 USC § 1313(d)(4)(A).) The CWA, which thus contemplates that WLAs can be created apart from a final TMDL, supports this interpretation. Note that, as above, even with a TMDL, local excursions above criteria must be prevented.

3. Similar to new permits, existing permits must insure compliance with WQS.

Irrespective of anti-backsliding, interim permits must protect applicable WQS. 40 C.F.R. section 122.44(d) requires that NPDES permits contain any more stringent requirements necessary to achieve water quality standards. Specifically, when WQBELs are developed, the permitting authority "shall ensure that:"

> The level of water quality to be achieved by limits on point sources established under this paragraph *is derived from, and complies with all applicable water quality standards*. (40 C.F.R. § 122.44(d)(1)(vii)(A) (emphasis added).)

Moreover, permits shall incorporate "any more stringent limitation, including those necessary to meet water quality standards" or those "required to implement any applicable water quality standard established pursuant to this chapter." (33 U.S.C. § 1311(b)(1)(C). See also 40 C.F.R. § 122.44(d)(5).)

The extent to which the above language authorizes or prohibits offsets in the absence of a TMDL is not clear. While it appears to be somewhat less proscriptive than the companion "cause or contribute" requirement applicable to new sources (see 40 C.F.R. § 122.4(i), supra), in practice they appear to have the same effect. (See e.g. 40 C.F.R. § 122.44(d)(1)(i).) Accordingly, the analysis set forth in section IV.A., supra, would be equally applicable here.

Variances

Similar to compliance schedules, which grant extensions of time to comply with criteria, the federal regulations authorize the use of variances in the State's discretion, subject to EPA's approval. (40 CFR § 131.13.) Where variances are authorized, Regional Boards may grant such variances in consideration of, or condition them upon, the performance of an appropriate offset which helps guarantee that protection of beneficial uses will not be compromised or that the

public interest will be served. (See Water Code § 13269.) Variances are authorized in certain circumstances, e.g., in section III.I of the California Ocean Plan (2000), as well as in the Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California at section 5.3, for categorical and case-by-case exceptions to CTR criteria for resource and pest management, and for drinking water. Individual Regional Water Quality Control Plans may also authorize variances for conventional pollutants as well. Notably, Water Quality Order No. 2001-12-DWQ, the recent statewide general NPDES permit for the discharge of aquatic pesticides, grants such a categorical exception.

V. Conclusion

The use of offsets, pollutant trading, or other market-based mechanisms to supplement water quality regulation in impaired waters is clearly appropriate when implemented in the context of a TMDL, in which case, substantial flexibility exists to achieve WQS. For impaired waters for which no TMDL has yet been created, the anti-backsliding rules must be considered. However, when considered in the context of regulating multiple sources with a single NPDES permit (bubbling), staged TMDL efforts, or other scenarios, the anti-backsliding rules may not be a restraint on the use of market-based regulation.

For new and existing sources, the federal regulations provide that new discharges may not "cause or contribute" to violations of WQS, and that existing discharges must be "derived from and comply with" all applicable WQS. However, significant legacy abatement programs or another large-scale offsets, may well meet regulatory scrutiny depending upon fact-specific circumstances that lead the Regional Board to conclude that, even in the absence of a TMDL, the offset coupled with the discharge, creates a watershed-based improvement of a magnitude that justifies a finding that the discharge does not contribute to impairment, and is consistent with WQS. As noted above, even in the absence of a final TMDL there may nonetheless be significant flexibility in certain circumstances, which must be evaluated within the context of the facts presented.

In any event, given the scope of California's obligations under CWA section 303(d), specifically the roughly 1400 TMDLs that must be adopted, as a practical matter, care should be taken that creative mechanisms, in advance of a TMDL, should be promotive of TMDL development or attainment of criteria generally.

Should you have any questions about this memorandum, please contact me at 341-5150, or Staff Counsel Michael Levy at 341-5193 or mlevy@exec.swrcb.ca.gov.

cc: See next page

cc: Celeste Cantú, Exec.
Tom Howard, Exec.
Stan Martinson, DWQ
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TO: Valerie Connor
Division of Water Quality

/S/

FROM: Michael J. Levy
Staff Counsel
OFFICE OF CHIEF COUNSEL

DATE: August 2, 2001

SUBJECT: REGULATORY AND STATUTORY TIME LIMITS IMPLICATED IN DEVELOPING CALIFORNIA'S 303(d) LISTING AND DELISTING POLICY

I. INTRODUCTION

This summary is developed in response to your request for an identification of timelines of relevant activities implicated in developing a policy to guide the process of generating and maintaining California's 303(d) List, and developing California's periodic submittal to the United State Environmental Protection Agency under Title 33 United States Code section 1313(d). Pertinent abstracts from relevant statutes and regulations follow, as does a chart outlining the respective deadlines. Per your request, the chart is organized in reverse order, from latest to earliest. Please note that to the extent requirements overlap, they can be consolidated by applying the broadest requirement.

II. ABSTRACT OF PERTINENT AUTHORITIES

Prior to adoption of any state policy for water quality control, the State Water Resources Control Board (State Board) must hold a public hearing respecting the adoption of the policy. Notice of the hearing must be given to the affected regional boards 60 days before the hearing unless the Regional Water Quality Control Boards (Regional Boards) waive notice. Notice shall be published within the affected region pursuant to Government Code section 6061. Regional Boards shall submit written recommendations to the State Board at least 20 days before the hearing. (Wat. Code § 13147.)

Notice under Government Code section 6061 requires publication once in a newspaper of general circulation. The notice need not include a copy of the regulation. (Gov. Code § 6060 - 61; 63 Ops.Cal.Atty.Gen. 474, June 4, 1980.)

40 Code of Federal Regulations section 25.5, regarding public hearings, requires notice prior to the hearing, that is "well publicized" and "mailed to appropriate portions of the list of interested and affected parties" 45 days prior to the hearing. The notice "shall include or be accompanied by" a discussion of the agency's tentative decision. (40 C.F.R. § 25.5(b).)

A Responsiveness Summary (identifying public participation activities, the matters on which the public was consulted, summarizing the public's views, comments, criticisms, and suggestions, and setting forth the agency's specific responses) shall be published as part of the preamble to interim and final regulations. (40 C.F.R. § 25.10.)

The Office of Administrative Law (OAL) shall approve or disapprove a policy or regulation within 30 working days of submittal, otherwise it will be deemed approved. (Gov. Code § 11349.3. See also Gov. Code § 11353(b) for details of what must be submitted to OAL.)

Government Code section 11353(d) requires that any revision of a policy or guideline shall be made available for inspection by the public within 30 days of its effective date.

III. APPLICABILITY OF CEQA

We are of the opinion that the California Environmental Quality Act (CEQA) (Pub. Res. Code § 21000 et seq.) does not apply to adoption of this policy because it appears that the policy cannot "have the potential for causing a significant effect on the environment." (Cal. Code Regs., tit. 14, § 15061(b)(3).) A "significant effect on the environment" is defined as "a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected." (Cal. Code Regs., tit. 14, § 15382.) This conclusion is based on at least the following:

?? Improving water quality is not an "adverse change;"

?? Developing a list of impaired waters as required by Title 33 United States Code section 303(d), does not affect any change in physical conditions in any area affected.

Moreover, even if the policy could constitute a "significant effect on the environment," it would fall within at least two categorical exemptions, specifically, those pertaining to regulatory actions to protect natural resources (Cal. Code Regs., tit. 14, § 15307), and regulatory actions to protect the environment (Cal. Code Regs., tit. 14, § 15308). Accordingly, we would want to consider filing a Notice of Exemption (NOE) after the policy is approved by OAL. (Cal. Code Regs., tit. 14, § 15062(a).) The NOE would start running a 35-day statute of limitations within which to challenge the determination that the project is CEQA exempt. (Cal. Code Regs., tit. 14, § 15062(d).)

Notwithstanding the above conclusion, the State Board's regulations at Chapter 27, Article 6, relating to Exempt Regulatory Programs (Cal. Code Regs., tit. 23 § 3775 et seq.), require that

certain actions that are deemed "functionally equivalent" to CEQA be undertaken whenever "[a]ny standard, rule, regulation, or plan [is] proposed for board approval or adoption." (Cal. Code Regs., tit. 23, § 3777(a).) Section 3777(a), perhaps inadvertently, does not contain an exception for actions that should fall outside of the applicable scope of CEQA. While it could properly be argued that Article 6 does not apply unless CEQA would otherwise be implicated, the most cautious approach would be to nonetheless employ the procedures set forth in Article 6. Although this approach will require the State Board to perform additional tasks in connection with the policy, in large measure these tasks would be required in any event. Notably, assuming there are no significant effects, the end result would still be the functional equivalent of either an NOE or Negative Declaration, not an Environmental Impact Report. Please note that the conclusion of no significant effects is preliminary. If the contents of the policy subsequently dictate a contrary conclusion, a further examination of which procedures to follow would be appropriate.

Article 6 requires that the policy be accompanied by a completed Environmental Checklist, an outdated copy of which is set forth at Appendix A, following the Article. The Office of Planning and Research has developed a more up-to-date form. A written report must also be prepared, containing the following:

?? A brief description of the proposed activity;

?? Reasonable alternatives to the proposed activity; and

?? Mitigation measures to minimize any significant adverse environmental impacts from the activity.

(Cal. Code Regs., tit. 23, § 3777(a).) After completion of the written report, the State Board is required to provide a Notice of Filing (NOF) of the report to the public and to any person who in writing requests such notice. (Cal. Code Regs., tit. 23, § 3777(b).) An example of the NOF is contained at Appendix C, following the Article, but it should be modified as appropriate. The State Board must provide the NOF at least 45 days prior to the date of the hearing. (*Id.*) This report may also satisfy the parts of OAL's regulations that require a summary of the regulatory provisions that are proposed and a summary of the necessity for the regulatory provisions. The report should be drafted with those provisions in mind. (See Gov. Code § 11353(b).)

Upon completion of the written report, the State Board is required to consult with other public agencies that have jurisdiction over the proposed activity, and persons having special expertise with regard to any potential environmental effects. (Cal. Code Regs., tit. 23, § 3778.) This can be accomplished by transmitting of copy of the written report, or by any other appropriate means. (*Id.*)

Article 6 requires the State Board to prepare responses to comments received 15 days or more before the hearing, and such responses shall be available at the hearing for any person to review. (Cal. Code Regs., tit. 23, § 3779(a).) Any comments received less than 15 days before the hearing should responded to in writing to the extent feasible, and if not, they must be addressed

orally at the hearing. (Cal. Code Regs., tit. 23, § 3779(b).) Responses to comments shall become part of the administrative record. (*Id.*) The State Board is prohibited from approving a project if there are feasible alternatives or feasible mitigation measures available that would substantially lessen any significant adverse impact on the environment from the project. (Cal. Code Regs., tit. 23, § 3780.)

The final requirement from Article 6 prescribes that the State Board shall file a Notice of Decision (NOD) with the Secretary for Resources, who will post the NOD for public inspection for at least 30 days. The NOD must be filed with the Secretary after the project is adopted or approved. (23 Cal. Code Regs., § 3781.) A sample NOD is located at Appendix B following Article 6.

IV. SUMMARY OF APPLICABLE TIMELINES

Action	Day (minimum time)	Authority
Policy must be made available for inspection by the public within 30 days of its effective date.	30 days before effective date of policy	(Gov. Code § 11353(d))
File CEQA Notice of Exemption.	After policy approved (starts 35-day limit to challenge NOE)	(Cal. Code Regs., tit. 14, § 15062.)
File NOD with the Secretary of Resources	After policy approved by OAL	(Cal. Code Regs., tit. 23, § 3781.)
OAL Approval or disapproval.	30 days after submit to OAL	(Gov. Code § 11349.3)
Hearing	**Day 0**	
Compile written responses to comments received 15 or more days before the hearing; responses must be available for public review at hearing. To extent possible compile responses for remaining comments, or at least insure responses are made orally.	-15	(Cal. Code Regs., tit. 23, § 3779.)

Regional Boards submit written recommendations to State Board.	-20	(Wat. Code § 13147)
Reports, documents, and data relevant to the discussion shall be made available to the public.	-30 (or earlier if needed to allow time to assimilate comments)	(40 C.F.R. § 25.5(b), 25.4(c).)
Mail notice to interested and affected parties, with a discussion of the tentative decision and information on where to acquire relevant materials.	-45 (state law requires 10 days notice)	(40 C.F.R. § 25.5(b), 25.4(c), 25.4(b)(5); Gov. Code § 11125.)
Provide Notice of Filing (of environmental checklist and report) to public; and consult with relevant agencies and persons with special expertise.	-45	(Cal. Code Regs., tit. 23, § 3777(b). 3778.)
Notice of Hearing to RBs	-60	(Wat. Code § 13147)
Publish Notice in affected regions in newspaper of general circulation.	-60	(Gov. Code § 6060, 6061)

Should you have any questions, please feel free to contact me at 341-5193 or mlevy@exec.swrcb.ca.gov.

cc: Stan Martinson, DWQ
Stefan Lorenzato, DWQ
Tom Mumley, San Francisco Bay RWQCB
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TO: Teresa Newkirk
Unit Chief, TMDL Development
Colorado River Basin RWQCB

FROM: Lori T. Okun /s/
Staff Counsel
OFFICE OF CHIEF COUNSEL

DATE: 7/10/01

SUBJECT: TIMING REQUIREMENTS FOR REGIONAL BOARD AGENDA ITEMS

This memorandum discusses the various deadlines that govern submitting total maximum daily loads (TMDL) to the Regional Water Quality Control Board (Regional Board). Procedurally, the Regional Board adopts a TMDL by amending the Basin Plan to incorporate the TMDL. The Clean Water Act, CEQA, and the Bagley-Keene Open Meeting Act (and related regulations) all include relevant timelines. In general, staff must complete the TMDL report and Basin Plan amendment, provide the Notice of Filing, and notify interested parties of its tentative decision at least **45 days before the Regional Board meeting**. Written responses to public comments must be complete **before the meeting**. Because staff needs time to prepare written comments, staff should provide the 45-day notice well in advance of the deadline for controversial items. The written responses need not be available to the public until the hearing. The Regional Board needs time to review the comment responses in advance of the hearing. Region 7's policy is to provide materials to the Board **seven to ten days before the meeting** where possible.

Thus, in order to ensure that staff has time to prepare comment responses and provide them to the Board in a timely manner, staff should issue provide the Notice of Filing at least 60 days before the meeting. Staff should also start working on comment responses well in advance of the meeting.

DISCUSSION

State Water Resources Control Board (State Water Board) regulations require the Regional Board to make the TMDL report (the CEQA "substitute document") available for public comment for at least 45 days. The 45-day period commences with the Notice of Filing and ends

on or before the Regional Board hearing (*i.e.*, the Board meeting) on the amendment. (Cal. Code Regs., tit. 23, § 3777.)[1]

Clean Water Act regulations require the Regional Board to mail notice of the amendment to all interested parties at least 45 days before the hearing.[2] (40 C.F.R. § 25.5(b).) Interested parties are those "persons and organizations who have expressed an interest in or may, by the nature of their purposes, activities or members, be affected by or have an interest in any covered activity." (40 C.F.R. § 25.4(b)(5).) In addition, where possible, interested parties include "among others, representatives of consumer, environmental, and minority associations; trade, industrial, agricultural, and labor organizations; public health, scientific, and professional societies; civic associations; public officials; and governmental and educational associations." (*Id.*; 40 C.F.R. § 25.3(a).) The Clean Water Act notice must include the Regional Board's tentative decision, if any, and information regarding how to obtain copies of relevant documents.

The Regional Board must provide written responses to significant public comments before adopting a TMDL or Basin Plan amendment. (*Mountain Lion Foundation v. Fish & Game Com.* (1997) 16 Cal.4th 105, 133; *Friends of the Old Trees v. Dept. of Forestry and Fire Protection* (1997) 52 Cal.App.4th 1383, 1403; Cal. Code Regs., tit. 23, § 3779.) The comments must be available to the public at the Regional Board hearing. (Cal. Code Regs., tit. 23, § 3779.) The Regional Board must provide written responses to all significant comments that the Board receives 15 or more days before the hearing. The Regional Board should respond in writing to later comments if feasible. When written responses to later comments are not feasible or when oral comments are presented at the hearing, the Regional Board must respond orally to the comments at the hearing. (Cal. Code Regs., tit. 23, § 3779.)

As a practical matter, staff prepares the written response on behalf of the Regional Board. Region 7's policy is to provide meeting materials to Board members seven to ten days before each meeting. Responses to comments must be fairly detailed,[3] which will affect staff's planning for meeting these timelines. When calendaring the date for providing the CEQA Notice of Filing and Clean Water Act notice, staff should allow time to prepare the written comments.

The resolution adopting the Basin Plan amendment must be on the Regional Board's agenda. The agenda must describe the resolution in sufficient detail to inform the public about the issues the Board will consider. (Gov. Code § 11125; 67 Ops.Cal.Atty.Gen. 84 (1984); Cal. Code Regs., tit. 23, § 647.2.) The Regional Board must provide the agenda at least 10 days before the hearing to anyone who has requested notice (Cal. Code Regs., tit. 23, § 647.2.), and to all cities and

[1] The Clean Water Act also has a 45-day notice period for hearings, and a 30-day requirement for comments. (40 C.F.R. Part 25.) CEQA only requires a 30-day comment period (*Ultramar, Inc. v. SCAQMD* (1993) 17 Cal.App.4th 689, 698-700; Pub Resources Code § 21080.5, subd. (d)(3)), but the longer periods in the CWA and SWRCB regulations control.

[2] The notice requirement may be reduced to 30 days for workshops, if there is good reason why the Board cannot provide longer notice. (40 C.F.R. § 25.6.)

[3] See my memorandum to you dated June 14, 2001.

counties, and certain newspapers, within the region. (Gov. Code § 11125.9.) These notice requirements probably will not affect staff's planning deadlines.

After the Regional Board adopts the TMDL and Basin Plan amendment, the Regional Board must submit the Basin Plan amendment and administrative record to the State Board. (Wat. Code §§ 13245.5, 13246; Gov. Code § 11347.3, subd. (c).) (The State Board must include copy of the rulemaking file when it submits the amendment to the Office of Administrative Law (OAL).) There is no statutory deadline for the Regional Board's submission. Once the Regional Board submits the amendment, the State Board must provide 45 days public notice before acting on it (Gov. Code § 11346.4), but must act within 60 days (Wat. Code § 13246).[4] (See also, *State Water Resources Control Board v. Office of Administrative Law* (1993) 12 Cal.App.4th 697, 701-706.) The State Board then sends the amendment to OAL and, after OAL approval, to the U.S. EPA. The Regional Board files a Notice of Decision with the Secretary for Resources after final approval of the TMDL.

Please contact me if you have further questions or if you need information about what the administrative record should contain.

cc: Regional Board Attorneys, OCC
Michael J. Levy, OCC

[4] These time periods are concurrent; *i.e.*, if the State Board provided public notice on Day 1, the Board could act on the amendment between Day 46 and Day 60.

bc: Phil Wyels, OCC
Lori Okun, OCC
Debbie Matulis, OCC

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TO: Stefan Lorenzato
TMDL Coordinator
Division of Water Quality

/ s /

FROM: Michael J. Levy
Staff Counsel
OFFICE OF CHIEF COUNSEL

DATE: January 26, 2001

SUBJECT: GUIDANCE REGARDING THE EXTENT TO WHICH EFFLUENT LIMITATIONS SET FORTH IN NPDES PERMITS CAN BE RELAXED IN CONJUNCTION WITH A TMDL

This memorandum is intended to address whether and to what extent effluent limitations in existing NPDES permits can be conditionally relaxed[1] to accommodate a TMDL implementation program. The inquiry concerns the extent to which point sources can be offered incentives to participate in some sort of watershed restoration effort, or other broad-based program designed to bring the watershed into compliance with the state water-quality standards.[2]

I. Whether effluent limitations in an NPDES permit can be relaxed depends upon which effluent limitations are under consideration

A. Technology-based effluent limitations cannot be relaxed

The Code of Federal Regulations (CFR) dictates that the technology-based effluent limitations (TBELs) shall be the floor to controls that are permissible under the Clean Water Act.

> "Technology-based treatment requirements under section 301(b) of the Act represent the minimum level of control that must be imposed in a

[1] The term "conditional waiver" describes procedures under California Water Code § 13269 whereby state Waste Discharge Requirements ("WDRs") may be waived subject to certain conditions that guarantee that the waiver is not against the public interest. Unlike state WDRs, NPDES permits cannot be waived. (33 USC § 1311(a).) Since the term "conditional waiver" is a term-of-art, peculiar to state law, and may carry with it unintended connotations, its use is avoided in this memorandum and should be avoided when discussing NPDES permits or other requirements of federal law.

[2] As used in this memorandum, the term "water quality standards" is as defined in Section 303 of the Clean Water Act (33 USC § 1313) and the pertinent regulations. (40 CFR § 130.3.) The term, as applied to California, refers to the water quality control plans (Water Code § 13240), water quality objectives (Water Code § 13241), the anti-degradation policy (Water Code § 13000), and all other water quality requirements of the State.

permit issued under section 402 of the Act." (40 CFR § 125.3.) Furthermore, the regulations proscribe:

> "In no event may a [NPDES] permit ...be renewed, reissued, or modified to contain an effluent limitation which is less stringent than required by effluent guidelines [technology-based limits pursuant to Section 304(b)] in effect at the time the permit is renewed reissued, or modified." (40 CFR §122.44(l)(2)(ii). See also 33 USC §1313(e)(3)(A).) Thus, the TBELs set forth in a NPDES permit cannot be relaxed under any circumstance relevant in this memorandum.[3]"

B. Water-quality based effluent limitations may be tightened or relaxed so long as the ultimate NPDES permit is consistent with assumptions and requirements of the TMDL

While the CFR dictates that the TBELs are the floor to discharges allowed in NPDES permits, the only floor to water-quality based effluent limitations (WQBELs) prescribed for impaired waters is the water-quality standards themselves.

> "In no event may such a permit to discharge into waters be renewed, issued, or modified to contain a less stringent effluent limitation <u>if the implementation of such limitation would result in a violation of a water quality standard under section 303 applicable to such waters.</u> (40 CFR § 122.44(l)(2)(ii) (emphasis added.)
>
> When developing water quality-based effluent limits under this paragraph the permitting authority shall ensure that: [¶] (A) The level of water quality to be achieved by limits on point sources established under this paragraph <u>is derived from, and complies with all applicable water quality standards</u>; and [¶] (B) Effluent limits developed to protect a narrative water quality criterion, a numeric water quality criterion, or both, <u>are consistent with the assumptions and requirements of any available wasteload allocation</u> for the discharge prepared by the State and approved by EPA pursuant to 40 CFR 130.7. " (40 CFR § 122.44(d)(1)(vii) (emphasis added).)

Although the federal anti-backsliding stature would ordinarily preclude the relaxation of a WQBEL, a specific exception exists when such relaxation is in the context of a TMDL:

> "[A] permit may not be renewed, reissued, or modified to contain effluent limitations which are less stringent than the comparable effluent limitations in the previous permit <u>except in compliance with section 1313(d)(4) [303(d)(4)] of this title.</u> (33 USC § 1342(o)(1).)"

[3] The only exceptions to this rule are set forth in 40 CFR § 122.44(l)(2)(i), and relate largely to technical or legal mistakes, necessity, or changes to the facility.

While the EPA might have required WQBELs to be identical to a discharger's wasteload allocation, it did not do so. The EPA instead opted to provide the states the latitude to determine how to achieve the end results dictated by the TMDL. Accordingly, the regulations require that the WQBELs be "consistent with the assumptions and requirements of" rather than "identical to" or "not less stringent than" wasteload allocations. The regulations thus do allow the permitting authority to craft creative solutions that may include incentives to point source dischargers to assist in non-point source abatement through programs that include relaxation of the otherwise applicable level of WQBELs. These alternative requirements in lieu of application of the most restrictive WQBELs are permissible only if they are "consistent with the assumptions and requirements" of the TMDL, and will not result in violation of the water quality standards. Moreover, given the code's requirement that loads be established considering seasonal variations and a margin of safety which takes into account any lack of knowledge (33 USC § 1313(d)(1)(C)), the permitting authority should take care to consider the scientific uncertainty attendant to any alternative plans to be sure that such a plan will not result in a violation of the water quality standards.

Such requirements or incentives should not be mistaken for waivers of WQBELs. The NPDES permit will still contain a WQBEL, which is not and cannot be waived. However, the level of the WQBEL may be less restrictive, or significantly less restrictive than set forth in the previous NPDES permit so long as the relaxed WQBEL is conditioned upon the other requirements which collectively "are consistent with the assumptions" of the TMDL and "will not result in violation" of the water-quality standards. The above analysis is entirely consistent with the EPA's concept of the functions of a wasteload allocation, which the regulations define as "a type of water quality-based effluent limitation." (40 CFR § 130.2(h).) Hence,

> "[i]f Best Management Practices (BMPs) or other nonpoint source pollution controls make more stringent load allocations practicable, then wasteload allocations can be made less stringent. Thus, the TMDL process provides for nonpoint source control tradeoffs. (40 CFR § 130.2(i). See also 33 USC § 1313(d)(4)(A) [effluent limitations may be revised if the cumulative effect of all such revisions will assure attainment of the water quality standards].)"

The foregoing discussion should not be interpreted to imply that an offset program is required to relax a WQBEL. Again, the WQBEL only needs to be consistent with the assumptions and requirements of the TMDL and will not result in a violation of water quality standards. Accordingly, a WQBEL can be implemented that is substantially less stringent than the existing limitation, if for instance, the increased share of the wasteload allocated to the point source is accommodated by more stringent effluent limitations elsewhere, or by other appropriate assumptions of the TMDL that are designed to achieve water quality standards. In this respect, a relaxed WQBEL need not even be conditioned upon participation in other pollutant-abatement programs.

II. Requirements that impose conditions on relaxed WQBELs must be set forth in the NPDES permit and be directly enforceable.

Any additional requirements issued in lieu of a stringent WQBEL must be memorialized in the body of the NPDES permit:

> "In addition to the conditions established under § 122.43(a), each NPDES permit shall include conditions meeting the following requirements when applicable.
>
> (d) Water quality standards and state requirements: any requirements in addition to or more stringent than promulgated effluent limitations guidelines ... necessary to: [¶] (1) Achieve water quality standards established under section 303...." (44 CFR § 122.44(d)(1).) Notably, any such requirements that are contained in the NPDES permit will be enforceable with civil or criminal penalties, or injunctive relief under Water Code sections 13385(a)(2), 13386, and 13387(a)(2), as well as 13350(a)."

III. Conclusion

A NPDES permit for an impaired water body must contain both technology-based and water quality-based effluent limitations The TBELs may not be relaxed in contemplation of a TMDL implementation program, but significant latitude is available when crafting the WQBELs. The limits of that latitude, however, are twofold. 1) The WQBELs must not result in a violation of water quality standards; and 2) the WQBELs must be consistent with the assumptions of the TMDL, which, of course, is designed to achieve the water quality standards. Any alternatives that are instituted as a condition of a relaxed WQBEL must be memorialized in the discharger's NPDES permit.

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Gray Davis
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TO: Jim Kassel, DWQ
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/ s /
FROM: Michael J. Levy
Staff Counsel
OFFICE OF CHIEF COUNSEL

DATE: December 21 2000

SUBJECT: GUIDANCE REGARDING SECTION 303(D) LIST FOR THE 2002 SUBMISSION

This memorandum is in response to an options memorandum from Stefan Lorenzato that outlines several ways in which the State Water Board might address the Section 303(d) List for the year 2002, given that no listing policy is currently in place. The memorandum is intended to provide legal guidance on the level of involvement the State Water Board should have in developing the 303(d) list for the 2002 submission, and what actions must be undertaken to avoid the risk of litigation premised upon allegations of "underground regulations."

I. The State Water Board may exercise as much or as little control over the development of the 303(d) list as it deems appropriate, but in the absence of a regulation on point, it should exercise the ultimate discretion over the composition of the list

Section 303(d) of the Clean Water Act requires that "*each state* shall identify those waters..." for which effluent limitations are not stringent enough to achieve water quality standards. (33 USC § 1313(d) (emphasis added).) Article 4 of Chapter 3 of the Porter-Cologne Water Quality Control Act, addressing the powers and duties of the State Water Board, sets forth that:

> The state board is designated as the state water pollution control agency for all purposes stated in the Federal Water Pollution Control Act ..., and is ... (b) authorized to exercise any powers delegated to the state by the [Clean Water Act]. (Water Code § 13160.)

While at first glance section 13160 might be deemed a charge solely to the State Water Board, nothing in that section precludes delegation of some or all of that authority to the Regional Water Boards. In fact while subdivision (a) of 13160 assigns certification processes (e.g., under

section 401 of the Clean Water Act) to the State Water Board, the State Water Board delegated the primary responsibility of certifications to the Regional Water Boards. (See 23 Cal. Code. Regs. § 3830 et seq.)

Given the fact that no such regulations have been promulgated relative to the 303(d) listing process, however, it would appear that the State Water Board should exercise the ultimate discretion over the composition of the list. Notably, by retaining the ultimate discretion over the List, any litigation about the contents of the List or the processes used would necessarily be consolidated at the State Water Board level, rather than incrementally in the various regions.

II. To minimize the risk of "underground regulation" litigation, the State Water Board should ensure the TMDL listing policy that has not yet been developed is not applied to dictate the manner in which the 2002 List is developed

The Administrative Procedures Act (Govt. Code § 11370 et seq. hereinafter "APA") governs the manner in which agencies are permitted to promulgate regulations. The term "underground regulations" has been coined to describe informal rules or regulations that have not been adopted in accordance with the APA.

> The APA is partly designed to eliminate the use of "underground" regulations; rules which only the government knows about. If a policy or procedure falls within the definition of a "regulation" within the meaning of the APA, the promulgating agency must comply with the procedures for formalizing such regulation, which include public notice and approval by the Office of Administrative Law (OAL). Failure to comply with the APA nullifies the rule. (*Kings Rehabilitation Center, Inc. v. Premo* (1999) 69 Cal.App.4th 215, 217, 81 Cal.Rptr.2d 406, 407, citing *Armistead v. State Personnel Board* (1978) 22 Cal.3d 198, 204, 149 Cal.Rptr. 1, 583 P.2d 744. See also *Tidewater Marine Western, Inc. v. Bradshaw* (1996) 14 Cal.4th 557, 59 Cal.Rptr.2d 186.)

Although due to time constraints, the 303(d) List for the year 2002 will necessarily be in the process of development at the same time that the State Water Board is developing its listing policy, the fact that both processes occur simultaneously does not give rise to a violation of the APA, provided the developing policy is not enforced upon those developing the List. Accordingly, though the State Water Board may assign the primary role of developing draft lists for each region to the Regional Water Boards, it would only violate the APA if direction were provided as to how the State Water Board interprets the authorities and expects them to be implemented, in the absence of a formal rule or policy. This is not to suggest that Regional Water Boards (or the State Water Board), in exercising their discretion when promulgating the list, cannot make use of any and all available information, including matters of which they are aware from the development of the policy. It does mean that the developing policy cannot be used to define the State and Regional Water Boards' interpretation of their obligations.

III. Conclusion

The State Water Board may choose whichever of the options described in the options memorandum that it determines is appropriate; however, the ultimate discretion about the composition of the 2002 List should be exercised by the State Water Board, in the absence of a regulation formally delegating those functions to the Regional Water Boards. Moreover, ensuring that the final List is the work-product of the State Water Board rather than the Regional Water Boards will necessarily consolidate any litigation about the composition of the List or the processes employed in its development, at the State level. Finally, to avoid the risk of litigation premised upon violations of the APA, the developing listing policy should not be used to define the State and Regional Water Boards' interpretation of their obligations in creating the 2002 List.

cc: Stefan Lorenzato
TMDL Coordinator
Division of Water Quality

bc: Ted Cobb, OCC

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1 T

TO: Stefan Lorenzato
TMDL Coordinator
Division of Water Quality

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

DATE: OCT 2 7 1999

SUBJECT: ECONOMIC CONSIDERATIONS IN TMDL DEVELOPMENT AND BASIN PLANNING

ISSUE

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

CONCLUSION

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

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

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

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

[2] See Wat. Code §§ 13240-13247.

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

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

DISCUSSION

I. STATE LAW

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

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

Each category is briefly discussed below.

A. Agricultural Water Quality Control Program

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

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

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

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

[5] Wat. Code § 13000 et seq.

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

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

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

B. Water Quality Objectives

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

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

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

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[6] *Id.* § 13141.

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

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

[9] *Ibid.*

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

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

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

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

C. CEQA

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

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

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

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[11] See Pub. Resources Code § 21080.

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

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

[14] *Id.* § 3777.

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

[16] Pub. Resources Code § 21159.

[17] Gov. Code §§ 11340-11359.

[18] *Id.* § 11342(d).

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

II. FEDERAL LAW

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

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

Attachment

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

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

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

[22] See *id.* § 131.10(g)(6).

[23] *Id.* § 131.3(e).

Cheon

State of California

Memorandum

To : Regional Water Board
Executive Officers

Regional Water Board Attorneys

Date: JAN - 4 1994

William R. Attwater
Chief Counsel
OFFICE OF THE CHIEF COUNSEL
From : STATE WATER RESOURCES CONTROL BOARD
901 P Street, Sacramento, CA 95814
Mail Code: G-8

Subject: GUIDANCE ON CONSIDERATION OF ECONOMICS IN THE ADOPTION OF WATER QUALITY OBJECTIVES

ISSUE

What is required of a Regional Water Quality Control Board (Regional Water Board) in order to fulfill its statutory duty to consider economics when adopting water quality objectives in water quality control plans or in waste discharge requirements?

CONCLUSION

A Regional Water Board is under an affirmative duty to consider economics when adopting water quality objectives in water quality control plans or, in the absence of applicable objectives in a water quality control plan, when adopting objectives on a case-by-case basis in waste discharge requirements. To fulfill this duty, the Regional Water Board should assess the costs of the proposed adoption of a water quality objective. This assessment will generally require the Regional Water Board to review available information to determine the following: (1) whether the objective is currently being attained; (2) what methods are available to achieve compliance with the objective, if it is not currently being attained; and (3) the costs of those methods. The Regional Water Board should also consider any information on economic impacts provided by the regulated community and other interested parties.

If the potential economic impacts of the proposed adoption of a water quality objective appear to be significant, the Regional Water Board must articulate why adoption of the objective is necessary to assure the reasonable protection of beneficial uses of state waters, despite the potential adverse economic consequences. For water quality control plan amendments, this

discussion could be included in the staff report or resolution for the proposed amendment. For waste discharge requirements, the rationale must be reflected in the findings.

DISCUSSION

A. Legal Analysis

1. Porter-Cologne Water Quality Control Act

Under the Porter-Cologne Water Quality Control Act, Water Code Section 13000 et seq. (Porter-Cologne Act or Act), the State Water Resources Control Board (State Water Board) and the Regional Water Boards are the principal state agencies charged with responsibility for water quality protection. The State and Regional Water Boards (Boards) exercise this responsibility primarily through the adoption of water quality control plans and the regulation of waste discharges which could affect water quality. See Water Code Secs. 13170, 13170.2, 13240, 13263, 13377, 13391.

Water quality control plans contain water quality objectives, as well as beneficial uses for the waters designated for protection and a program of implementation to achieve the objectives. Id. Sec. 13050(j). In the absence of applicable water quality objectives in a water quality control plan, the Regional Water Board may also develop objectives on a case-by-case basis in waste discharge requirements. See id. Sec. 13263(a).[1]

When adopting objectives either in a water quality control plan or in waste discharge requirements, the Boards are required to exercise their judgment to "ensure the reasonable protection of beneficial uses and the prevention of nuisance". Id. Secs. 13241, 13263; see id. Sec. 13170. The Porter-Cologne Act recognizes that water quality may change to some degree without

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1 The focus of this memorandum is limited to an analysis of the Boards' obligation to consider economics when adopting water quality objectives either in water quality control plans or, on a case-by-case basis, in waste discharge requirements. This memorandum does not discuss the extent to which the Boards' are required to consider the factors specified in Water Code Section 13241 in other situations. Specifically, this memorandum does not discuss the applicability of Section 13241 to the development of numeric effluent limitations, implementing narrative objectives contained in a water quality control plan. Further guidance on the latter topic will be developed at a later date.

causing an unreasonable effect on beneficial uses. Id. The Act, therefore, identifies factors which the Boards must consider in determining what level of protection is reasonable. Id.[2] These factors include economic considerations. Id.[3]

The legislative history of the Porter-Cologne Act indicates that "[c]onservatism in the direction of high quality should guide the establishment of objectives both in water quality control plans and in waste discharge requirements". Recommended Changes in Water Quality Control, Final Report of the Study Panel to the [State Water Board], Study Project--Water Quality Control Program, p. 15 (1969) (Final Report). Objectives should "be tailored on the high quality side of needs of the present and future beneficial uses". Id. at 12. Nevertheless, objectives must be reasonable, and economic considerations are a necessary part of the determination of reasonableness. "The regional boards must balance environmental characteristics, past, present and future beneficial uses, and economic considerations (both the cost of providing treatment facilities and the economic value of development) in establishing plans to achieve the highest water quality which is reasonable." Id. at 13.

2. Senate Bill 919

The Boards are under an additional mandate to consider economics when adopting objectives as a result of the recent enactment of Senate Bill 919. 1993 Cal. Stats., Chap. 1131, Sec. 8, to be codified at Pub. Res. Code, Div. 13, Ch. 4.5, Art. 4. The legislation, which is

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2 Other factors which must be considered include:

(a) Past, present, and probable future beneficial uses of water;
(b) Environmental characteristics of the hydrographic unit under consideration, including the quality of water available thereto;
(c) Water quality conditions that could reasonably be achieved through the coordinated control of all factors which affect water quality in the area;
(d) The need for developing housing within the region;
(e) The need to develop and use recycled water.

3 See also Water Code Section 13000 which mandates that activities and factors which may affect water quality "shall be regulated to attain the highest water quality which is reasonable, considering all demands being made and to be made on those waters and the total values involved, beneficial and detrimental, economic and social, tangible and intangible" (emphasis added).

effective January 1, 1994, amended the California Environmental Quality Control Act, Public Resources Code Section 21000 et seq. (CEQA), to require that, whenever the Boards adopt rules requiring the installation of pollution control equipment or establishing a performance standard or treatment requirement, the Boards must conduct an environmental analysis of the reasonably foreseeable methods of compliance. This analysis must take into account a reasonable range of factors, including economics. For the reasons explained above, the latter requirement is duplicative of existing requirements under the Porter-Cologne Act regarding consideration of economics.

B. Recommendation

The meaning of the mandate to "consider economics" in the Porter-Cologne Act is not entirely clear. It is clear that the Porter-Cologne Act does not specify the weight which must be given to economic considerations. Consequently, the Boards may adopt water quality objectives even though adoption may result in significant economic consequences to the regulated community. The Porter-Cologne Act also does not require the Boards to do a formal cost-benefit analysis.

The Porter-Cologne Act does impose an affirmative duty on the Boards to consider economics when adopting water quality objectives. The Boards probably cannot fulfill this duty simply by responding to economic information supplied by the regulated community. Rather, the Boards should assess the costs of adoption of a proposed water quality objective. This assessment will normally entail three steps. First, the Boards should review any available information on receiving water and effluent quality to determine whether the proposed objective is currently being attained or can be attained. If the proposed objective is not currently attainable, the Boards should identify the methods which are presently available for complying with the objective. Finally, the Boards should consider any available information on the costs associated with the treatment technologies or other methods which they have identified for complying with a proposed objective.[4]

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4 See, for example, Managing Wastewater In Coastal Urban Areas, National Research Council (1993). This text provides data on ten technically feasible wastewater treatment technologies, which can be used to make comparative judgments about performance and to estimate the approximate costs of meeting various effluent discharge standards, including standards for toxic organics and metals.

In making their assessment of the cost impacts of a proposed objective, the Boards are not required to engage in speculation. Rather, the Boards should review currently available information. In addition, the Boards should consider, and respond on the record, to any information provided by dischargers or other interested persons regarding the potential cost implications of adoption of a proposed objective.

If the economic consequences of adoption of a proposed water quality objective are potentially significant, the Boards must articulate why adoption of the objective is necessary to ensure reasonable protection of beneficial uses. If the objective is later subjected to a legal challenge, the courts will consider whether the Boards adequately considered all relevant factors and demonstrated a rational connection between those factors, the choice made, and the purposes of the Porter-Cologne Act. See California Hotel & Motel Assn. v. Industrial Welfare Com., 25 Cal.3d 200, 212, 157 Cal.Rptr. 840, 599 P.2d 31 (1979).

Reasons for adopting a water quality objective, despite adverse economic consequences, could include the sensitivity of the receiving waterbody and its beneficial uses, the toxicity of the regulated substance, the reliability of economic or attainability data provided by the regulated community, public health implications of adopting a less stringent objective, or other appropriate factors. These factors may also include the legislative directive that a "margin of safety [ ] be maintained to assure the protection of all beneficial uses." Final Report, p. 15 and App. A, p. 59.

If objectives are proposed for surface waters and adverse economic consequences stemming from adoption of the objectives could be avoided only if beneficial uses were downgraded, the Boards should address whether dedesignation would be feasible under the applicable requirements of the Clean Water Act and implementing regulations. See 40 C.F.R. Sec. 131.10. Dedesignation is feasible only for potential, rather than existing, uses. See id. Sec. 131.10(g). If dedesignation of potential beneficial uses is infeasible, the Boards should explain why, e.g., that there is a lack of data supporting dedesignation.[5]

5 It should also be noted that, even if dedesignation of potential beneficial uses is feasible, in the great majority of cases it will not have any significant effect on the selection of a proposed objective. This is so because the proposed objective will be necessary to protect existing beneficial uses, which cannot be dedesignated.

The State or Regional Water Board's rationale for determining that adoption of a proposed objective is necessary to protect water quality, despite adverse economic consequences, must be discernible from the record. This reasoning could be included in the staff report or in the resolution adopting a proposed water quality control plan amendment. When objectives are established on a case-by-case basis in waste discharge requirements, the rationale must be included in the findings.

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Winston H. Hickox
Secretary for Environmental Protection

Gray Davis
Governor

TO: Gerard J. Thibeault
Executive Officer
Santa Ana Regional Water Quality Control Board

FROM: William R. Attwater
Chief Counsel
OFFICE OF CHIEF COUNSEL

DATE: March 1, 1999

SUBJECT: Do TMDLs Have to Include Implementation Plans?

You have asked a series of questions regarding whether or not TMDLs (total maximum daily loads) have to include implementation plans. This memorandum first looks at whether implementation plans are required under federal law and, second, whether they are required under state law. The memorandum concludes that while it is federal policy that TMDLs should include implementation plans, they are not currently required under federal law. Implementation plans are required under state law. Your questions and brief responses follow.

I. Federal Law

Must TMDLs include implementation plans under federal law? The short answer is no, not at present. It is likely, however, that implementation plans will be required in the future, either as a result of a federal rule promulgation or, possibly, as an outcome of litigation.

A. Clean Water Act and Regulations

When Congress overhauled the Clean Water Act[1] in 1972, Congress decided to focus water pollution control on nationwide technology controls for point sources of pollution.[2] At the states' insistence, however, the federal Act retained a water quality-based strategy to address

[1] 33 U.S.C. § 1251 et seq.

[2] See, e.g., *id.* § 1311(b)(1)(A), (b)(2), & (b)(3).

surface waters that did not meet water quality standards.[3] This approach is contained in section 303(d)[4] of the Clean Water Act.

Section 303(d) of the Clean Water Act requires that the states identify and establish a priority ranking for waters that do not meet water quality standards after application of technology-based controls.[5] Water quality standards are the designated uses of a waterbody, together with criteria[6] to protect those uses, and an antidegradation policy.[7]

The states must then develop TMDLs to restore these waters. A TMDL establishes the allowable loadings or other quantifiable parameters for a waterbody. It is the sum of the loadings from point sources[8] (waste load allocations), best estimates of loadings from nonpoint sources and background (load allocations), and a margin of safety.[9]

Once a state adopts a TMDL, the state must submit it to the United States Environmental Protection Agency (EPA) for approval. If approved, the state must then incorporate the TMDL into its water quality management plan.[10] The state's water quality management plan consists of plans developed under section 208 of the Clean Water Act,[11] governing areawide waste treatment management, and plans developed as part of the state's continuing planning process under section 303(e).[12] If EPA disapproves the TMDL, EPA is required to step in and prepare the TMDL.

Section 303(d) stops at listing and TMDL development. It is silent regarding implementation. Section 303(e) goes on to require that the states have a "continuing planning process" with plans that include, among other things, TMDLs and adequate implementation for revised or new

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[3] See discussion in Houck, *TMDLs: The Resurrection of Water Quality Standards-Based Regulation Under the Clean Water Act*, 27 Envtl. L. Rep. 10,329 (1997).

[4] *Id.* § 1313(d).

[5] *Ibid.*

[6] State-adopted water quality objectives are synonymous with the federal term "criteria" under section 303(c) of the Clean Water Act. Compare 40 C.F.R. § 131.3(b) with Water Code § 13050(h).

[7] *Id.* § 1313(c)(2)(A); 40 C.F.R. §§ 130.2(d), 130.7(b)(3).

[8] "Point sources" are "any discernible, confined and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, . . . from which pollutants are or may be discharged. 33 U.S.C. § 1362(14).

[9] 40 C.F.R. §§ 130.2(I), 130.7(c)(1).

[10] 33 U.S.C. § 1313(d)(2).; 40 C.F.R. § 130.7(d)(2).

[11] 33 U.S.C. § 1288.

[12] *Id.* § 1313(e); see 40 C.F.R. § 130.6(a).

standards.[13] EPA can approve or disapprove the "process" but has no authority under this section to actually implement TMDLs.

Like the statute, EPA regulations implementing section 303(d) do not directly address implementation.[14] And, while a 1991 EPA guidance document discussed the need for implementation,[15] past EPA practice has not required that state TMDL submissions include an implementation plan.[16]

For point sources, implementation plans are not so critical. EPA regulations require that National Pollutant Discharge Elimination System (NPDES) permits[17] issued to regulate discharges to an impaired waterbody be consistent with any waste load allocations in an EPA-approved TMDL.[18] Through its oversight authority, EPA can ensure that state-issued permits are, in fact, consistent.[19] Nonpoint sources, however, are another matter. EPA has no direct authority under the Clean Water Act to implement or enforce nonpoint source controls.[20] Here, EPA is forced to rely on the good faith of the states and other measures, e.g. withholding grant funding, to persuade the states to implement TMDL load allocations for nonpoint sources.

B. Litigation

In recent years, EPA has faced a deluge of litigation throughout the nation over the states' and EPA's failure to comply with section 303(d).[21] The lawsuits initially focussed on the states' failure to list and, then, their failure to develop TMDLs for listed waterbodies. This focus is

[13] 33 U.S.C. § 1313(e)(3)(C) and (F). The reference to standards would be to those adopted or revised after enactment of the Clean Water Act on October 18, 1972.

[14] See 40 C.F.R. § 130.7.

[15] Guidance for Water Quality-based Decisions: The TMDL Process, EPA 440/4-91-001 (April 1991), pp. 15-16, 23-24.

[16] Report of the Federal Advisory Committee on the Total Maximum Daily Load (TMDL) Program, the National Advisory Council for Environmental Policy and Technology (NACEPT), EPA 100-R-98-006 (July 1998) (hereinafter FACA Report), p. 36.

[17] The Clean Water Act established the NPDES permit program. Under the Act, the point source discharge of pollutants to surface waters must be regulated under an NPDES permit. EPA or states with approved programs issue these permits. See 33 U.S.C. §§ 1311, 1342.

[18] 40 C.F.R. § 122.44(d)(1)(vii)(B).

[19] See 33 U.S.C. § 1342(c).

[20] See discussion in Conway, *TMDL Litigation: So Now What?*, 17 Va. Envtl. L. J. 83 (Fall 1997).

[21] See TMDL Lawsuit Information (February 3, 1999) <http://www.epa.gov/OWOW/tmdl/lawsuit1.html>.

changing.[22] Several recent cases question the content of TMDLs and some specifically seek not only TMDL development but also implementation.[23]

A recent consent decree in Washington state requires that TMDL schedules include plans for their implementation.[24] To date, however, there are no published court opinions that answer the question whether TMDLs must include implementation plans. It appears likely that, if asked to rule on the issue, a court would conclude that implementation plans can be required, either under section 303(d) or section 303(e). To rule otherwise would mean that significant federal and state resources are being wasted on what is purely a planning exercise. Even more significantly, it would unquestionably thwart the will of Congress "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters."[25]

C. EPA's Response

In response to the rising tide of litigation, EPA launched several initiatives. EPA issued TMDL guidance in 1997 establishing two significant policies.[26] The first set a deadline for completion of all TMDLs of from 8 to 13 years. The second directed that the states prepare implementation plans for TMDLs addressing waters impaired solely or primarily by nonpoint sources. The plans should include "reasonable assurances" that the TMDL's nonpoint source load allocations would be achieved. The plans could be submitted as water quality management plan revisions under section 303(e), coupled with a draft TMDL, or as part of an equivalent planning process. The policy also directed EPA regional administrators to take additional measures against states that did not develop implementation plans.[27]

In addition, EPA convened a Federal Advisory Committee Act (FACA) committee to advise EPA on new policy and regulatory directions for the program. The committee released its final

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[22] See discussion in Houck, *TMDLs III: A New Framework for the Clean Water Act's Ambient Standards Program*, 28 Envtl. L. Rep. 10415 (August, 1998).

[23] See, e.g., *The Neuse River Foundation, Inc.* v. *Browner*, No. 4:96-CV-188-BO(3) (E.D.N.C.), filed December 31, 1996 (plaintiffs seek an order directing EPA to establish TMDLs and to "implement and enforce" all TMDLs); *Kingman Park Civic Assn.* v. *U.S. Environmental Protection Agency*, No. 1:98CV00758 (D.D.C.), filed March 25, 1998 (plaintiffs seek an order requiring EPA to establish TMDLs and to ensure that they are implemented).

[24] Consent Decree, *Northwest Envtl. Advocates* v. *Browner*, No. 91427R (W.D. Wash.), January 20, 1998.

[25] 33 U.S.C. § 1251(a).

[26] FACA Report, fn. 16, *supra.*

[27] These included, for example, requiring a state to update its water quality management plan or to incorporate into the plan additional implementation measures on a statewide or specific watershed basis; or denying or revoking a state's enhanced benefits status under new Clean Water Act section 319 nonpoint source guidance and reverting to a more intense, project-by-project oversight process on annual section 319 grants.

report in July 1998.[28] The committee addressed TMDL implementation, as well as other issues, and reached consensus on several points. Overall, there was broad agreement that implementing TMDLs is the key to program success.[29] The committee agreed that section 303 of the Clean Water Act authorizes EPA to require implementation plans.[30] They also agreed that EPA should issue regulations requiring that the states prepare and submit an implementation plan and schedule concurrently with each TMDL.[31]

While the committee agreed that section 303 provides EPA sufficient authority to require implementation plans, the committee disagreed on whether these plans should be submitted under subsection (d) or (e).[32] The issue is significant because EPA is statutorily required to complete TMDLs if the states fail to do so. If implementation plans are a required part of a TMDL under section 303(d), EPA could ultimately be forced to complete a state's implementation plans. On the other hand, it is unclear whether, if TMDL implementation plans are required under section 303(e), EPA would be similarly required to establish the plans in the event of a state's failure to do so.

D. Current Status

Whether the United States Environmental Protection Agency (EPA) should require that TMDLs include implementation plans and, if so, under what authority are the $64,000 questions currently facing EPA. The FACA committee's recommendations are expected to significantly impact the TMDL program. EPA has drafted a proposed rule revising the existing TMDL regulations and is scheduled to publish the rule this summer.[33] The agency is expected to, among other things, require states to have implementation plans for TMDLs.[34] In addition to revising the TMDL regulations, EPA may also change the regulations under section 303(e), governing the continuing planning process.

II. State Law

Does state law require that TMDLs include implementation plans? Yes. The Regional Water Quality Control Boards (Regional Water Boards) are required to incorporate TMDLs in their

[28] Report of the Federal Advisory Committee on the Total Maximum Daily Load (TMDL) Program, the National Advisory Council for Environmental Policy and Technology (NACEPT), EPA 100-R-98-006 (July 1998) (hereinafter FACA Report).

[29] *Id.* at 5-6.

[30] *Id.* at 36 and H-2.

[31] *Id.* at 36-41 and App. H.

[32] *Ibid.*

[33] Inside EPA's Water Policy Report, vol. 8, no. 4 (February 17, 1999) at 18.

[34] *Ibid.*

water quality control plans (basin plans). Implementation plans are a required component of basin plans.

In general, Regional Water Boards base listing decisions under section 303(d) on the water quality standards in their basin plans. They list waterbodies for which technology-based effluent limitations and other pollution control requirements are not stringent enough to achieve designated beneficial uses or water quality objectives.[35] The Regional Water Boards then develop TMDLs, the goal of which is to attain the standard.

TMDLs adopted by the Regional Water Boards have certain common components. Typically, they contain a problem statement that identifies the waterbody, the standard that is not being achieved, and the pollutant or stressor that is causing the impairment; numeric targets, describing specific instream goals that reflect attainment of the standard; source identification; loading allocations; and an implementation plan.

The numeric target, in particular, is essentially an interpretation of an existing standard. It can be expressed in terms of mass per time (e.g., daily loading), toxicity, habitat indicators, or other appropriate measure that, if met, will achieve the standard. For waterbodies listed because of failure to meet a narrative water quality objective, the numeric target will be a quantitative interpretation of the narrative objective. For example, if a waterbody fails to achieve a narrative objective for settleable solids, the TMDL could include targets for annual mass sediment loading.

Federal law requires that TMDLs, upon EPA approval, be incorporated into the state's water quality management plan. California's water quality management plan consists of the Regional Water Boards' basin plans[36] and statewide water quality control plans.[37] State law, in turn, requires that basin plans have a program of implementation to achieve water quality objectives.[38] The implementation program must include a description of actions that are necessary to achieve the objectives, a time schedule for these actions, and a description of surveillance to determine compliance with the objectives.[39]

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[35] Some federal criteria, adopted by EPA pursuant to Clean Water Act section 303(c), also apply to California waters. See the National Toxics Rule, 40 C.F.R. § 131.36. Waterbodies can also be listed because they do not meet antidegradation requirements. Typically, however, water are listed for failure to achieve water quality objectives or beneficial uses.

[36] See Water Code §§ 13240-13247.

[37] See State of California Continuing Planning Process Document, State Water Resources Control Board, Division of Water Quality (September 1991).

[38] Water Code § 13050(j). Basin plans include three elements: beneficial use designations, water quality objectives to protect those uses, and a program of implementation to achieve objectives.

[39] *Id.* § 13242.

State law would require that a TMDL include an implementation plan because the TMDL normally is, in essence, an interpretation or refinement of an existing water quality objective. The TMDL has to be incorporated into the basin plan. And, because the TMDL supplements, interprets, or refines an existing objective, state law requires a program of implementation.[40] Therefore, the Regional Water Board will have to review the basin plan's existing implementation chapter to determine whether it adequately implements the objective, as newly interpreted.

For a TMDL whose goal is to achieve a standard based primarily on nonattainment of a designated beneficial use, for which there are no applicable objectives, a numeric target is established for each pollutant or stressor that interferes with attaining the use. Establishing a numeric target in these instances is analogous to establishing water quality objectives to protect a use. Thus, the Regional Water Board would again have to review its existing implementation program to determine its adequacy to implement the numeric targets.

Even if the Regional Water Boards did not have to develop implementation plans for TMDLs, they would still have to comply with the California Environmental Quality Act (CEQA).[41] CEQA compliance, in the absence of a defined implementation plan, could potentially be more difficult than it would be with one. Under CEQA, the Regional Water Board would have to identify the reasonably foreseeable methods of compliance with any TMDL provisions that established performance standards or treatment requirements.[42] The numeric targets and load allocations would probably fall into the category of performance standards. After identifying the reasonably foreseeable compliance methods, the Regional Water Board would have to analyze their reasonably foreseeable environmental impacts, taking into account a reasonable range of environmental, economic, and technical factors.[43]

A defined implementation plan may allow the Regional Water Board to more narrowly focus its CEQA analysis. Without one, the CEQA analysis could potentially be broader and more burdensome.

III. Questions and Answers

1. Question: *"When the Regional Board adopts a TMDL as a Basin Plan amendment, what are the Board's responsibilities with respect to adopting an implementation plan for the TMDL? What are the timing requirements?"*

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[40] See § 13050(j).

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

[42] *Id.* § 21159.

[43] *Ibid.*

Answer: Neither section 303(d) of the Clean Water Act nor regulations implementing the section currently require that TMDLs include an implementation plan. There are no published judicial decisions that address the question. It is current EPA policy that the states develop implementation plans for TMDLs, although the timing of these plans is unclear.

Under state law, the Regional Board must adopt an implementation plan for the TMDL. The plan should be adopted concurrently with the other TMDL components, if practicable, or within a short time frame thereafter. If it is not, the TMDL would not be effective until the implementation plan is adopted. For the reasons explained in the response to Question 3, it may not be advisable to adopt the TMDL in phases.

2. Question: *"If USEPA adopts the TMDL instead of the Regional Board, what are the Board's responsibilities to adopt and implement that TMDL? Must the Board prepare and adopt an implementation plan for a USEPA-adopted TMDL? What are the timing requirements?"*

Answer: Section 303(d) provides that if EPA adopts a TMDL, the state must incorporate it into its water quality management plan.[44] Although the statute appears to restrict the state to adopting EPA's TMDL, EPA Region 9 has taken the position that if the state were to adopt an acceptable TMDL, EPA would withdraw its TMDL, upon EPA approval of the state TMDL.

Generally speaking, if the Regional Water Board decided to incorporate EPA's TMDL into its basin plan, the Regional Water Board would have to develop an implementation plan. Although federal law does not currently require an implementation plan, this is likely to change in the future. Under state law, an implementation plan would be required. There is one possible exception to this general rule. For a waterbody impacted by only point source discharges, the argument could be made that the TMDL is self-implementing. Federal regulations already require that NPDES permits implement any waste load allocations in an applicable TMDL, and the Regional Water Boards must comply with these regulations.[45]

Neither section 303(d) nor the implementing regulations currently address the timing of the state's action. The best that can be said is that the state should act within a reasonable time period. What is reasonable will depend on the circumstances. The state's progress in implementing section 303(d), the amount of resources allotted by the state to this program,

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[44] 33 U.S.C. § 1313(d)(2); see 40 C.F.R. § 130.7(d)(2).

[45] 40 C.F.R. § 122.44(d)(1)(vii)(B); Cal. Code Regs., tit. 23, § 2235.2. But see the FACA Report, fn. 16, *supra*, recommending that an implementation plan for waterbodies impaired solely or primarily by point sources include specific timetables and commitments to issue or review permits with fixed compliance schedules, monitoring and enforcement commitment, ambient monitoring to assess the effectiveness of the waste load allocations in achieving standards, and a feedback loop. FACA Report at G-9.

and the relative ease or degree of difficulty involved in the effort are probably all factors which would bear on reasonableness.

3. Question: *"Can a TMDL be adopted by the Regional Board and incorporated into the Basin Plan with an understanding that an implementation [plan] would be adopted at some later specified or **unspecified** date?"*

   Answer: Theoretically speaking, a Regional Water Board could probably adopt a TMDL in two phases. That is, the Regional Water Board could first adopt the TMDL without an implementation plan, followed by adoption of an implementation plan at some later date.

   Although this is theoretically possible, it wouldn't make much sense for several reasons. First, under state law, an implementation plan is required. Consequently, the first basin plan amendment wouldn't be complete, and could not be implemented, until the later adoption of an implementation plan. Second, to the extent that the TMDL is not complete under state law, query whether this would meet the requirements of section 303(d). Third, for the reasons explained previously, CEQA compliance would probably be more difficult because the Regional Water Board would have to identify and analyze all reasonably foreseeable methods of compliance with the TMDL in the first phase. Fourth, adopting the TMDL in phases would require the Regional Water Board to use its resources for two public adoption processes, rather than one. Finally, adopting a TMDL without an implementation plan may raise "clarity" issues for the Office of Administrative Law (OAL).[46] OAL may determine that the TMDL cannot be approved under the rulemaking provisions of the Administrative Procedure Act[47] because its impact on the regulated community is unclear, without an implementation plan. In any event, any lengthy delay in adopting an implementation plan is unsupportable.

4. Question: *"TMDLs do not include compliance schedules, which are generally provided in TMDL implementation plans. If an implementation plan, with schedules, is not adopted when a TMDL is adopted by the State (i.e. approved by the Regional Board, State Board and the Office of Administrative Law) does the TMDL take effect immediately, and must it be enforced immediately? Some Regional Board Basin Plans include generic compliance schedule provisions, while others do not (the Region 8 Basin Plan does not include such provisions). Where these compliance schedule provisions exist in Basin Plans, can they be used to establish TMDL implementation schedules?"*

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[46] See Gov. Code §§ 11349.1, 11353(b)(4). "'Clarity' means written or displayed so that the meaning of regulations will be easily understood by those persons directly affected by them." *Id.* § 11349(c).

[47] See *id.* §§ 11340-11359.

Answer: A time schedule for implementing a TMDL has to be part of an implementation program under state law. In general, state law would require that a TMDL include an implementation program. With the possible exception of a TMDL affecting only or primarily point source dischargers (see response to Question 3, above), a TMDL would not be effective, and could not be implemented, until an implementation program was adopted. Of course, the program could consist of the Regional Water Board's existing implementation program if: (1) that program is adequate to achieve the water quality standard in question and (2) the implementation program contains the required elements, e.g. a description of necessary actions to achieve the objective, a time schedule for those actions, and a description of surveillance to determine compliance with the objective.

All of the Regional Water Boards currently are authorized to include compliance schedules in waste discharge requirements for discharges not subject to regulation under an NPDES permit.[48] Two of the Regional Water Boards[49] have included specific compliance schedule provisions in their basin plans that apply only to NPDES permits. The fact that the Regional Water Boards can include compliance schedules in individual waste discharge requirements, or in limited circumstances in NPDES permits, would not obviate the need for an implementation program with a time schedule to achieve compliance with the applicable standard.

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Stan Martinson, DWQ
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bc: All WQ attorneys

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[48] See Water Code § 13263(c); Cal. Code Regs., tit. 23, § 2231.

[49] These are the Central Valley and San Francisco Bay Regional Water Boards.

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Gray Davis
Governor
State of California

TO: William R. Attwater
Chief Counsel

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

DATE: January 7, 1999

SUBJECT: TMDL QUESTIONS

By way of background, both the Clean Water Act and implementing regulations require that the states establish a priority ranking for listed waterbodies.

1. Have we or U.S. EPA ever been sued over not working on a TMDL ranked as a medium or low priority for TMDL development?

   RESPONSE: Yes. U.S. EPA has been sued over the state's failure to do any TMDLs, regardless of ranking. For example, environmental groups sued U.S. EPA over the state's failure to do TMDLs for all listed waters in the North Coast and Los Angeles regions. These included low and medium-ranked waterbodies.

   I am not aware of any lawsuits which have focused on the propriety of a particular priority ranking. The lawsuits, in general, have focused on the state's alleged failure to do any TMDLs.

2. Does a ranking of medium or low "preclude" a lawsuit if there are still highs on the list for any given Regional Board?

   RESPONSE: No. As explained above, U.S. EPA is being sued for the state's failure to do any TMDLs. If the state could demonstrate that it was diligently developing TMDLs for listed waterbodies in accordance with its priority ranking system, the state might prevail in a lawsuit challenging the state's failure to doTMDLs for medium or low-ranked waters.

3. If we, or U.S. EPA, are vulnerable to lawsuits for mediums or lows, what is the value of the ranking system in terms of trying to prioritize our resources to work on the more important chemicals or substances?

   RESPONSE: Priority ranking satisfies several objectives. First, it is legally required. Second, it allows the Regional Water Board to allocate resources in a rational manner. Waterbody rankings are not based solely on threat to water quality and beneficial uses. The Regional Boards consider other factors, such as how a TMDL fits with related activities in the watershed and the potential for beneficial use recovery.

cc: Stan Martinson, DWQ
Stefan Lorenzato, DWQ

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State of California

Memorandum

To : Regional Water Board Executive Officers

Regional Water Board Attorneys

Date: SAN - 4 1994

William R. Attwater
Chief Counsel
OFFICE OF THE CHIEF COUNSEL
From : **STATE WATER RESOURCES CONTROL BOARD**
901 P Street, Sacramento, CA 95814
Mail Code: G-8

Subject: GUIDANCE ON CONSIDERATION OF ECONOMICS IN THE ADOPTION OF WATER QUALITY OBJECTIVES

ISSUE

What is required of a Regional Water Quality Control Board (Regional Water Board). in order to fulfill its statutory duty to consider economics when adopting water quality objectives in water quality control plans or in waste discharge requirements?

CONCLUSION

A Regional Water Board is under an affirmative duty to consider economics when adopting water quality objectives in water quality control plans or, in the absence of applicable objectives in a water quality control plan, when adopting objectives on a case-by-case basis in waste discharge requirements. To fulfill this duty, the Regional Water Board should assess the costs of the proposed adoption of a water quality objective. This assessment will generally require the Regional Water Board to review available information to determine the following: (1) whether the objective is currently being attained; (2) what methods are available to achieve compliance with the objective, if it is not currently being attained; and **(3)** the costs of those methods. The Regional Water Board should also consider any information on economic impacts provided by the regulated community and other interested parties.

If the potential economic impacts of the proposed adoption of a water quality objective appear to be significant, the Regional Water Board must articulate why adoption of the objective is necessary to assure the reasonable protection of beneficial uses of state waters, despite the potential adverse economic consequences. For water quality control plan amendments, this

discussion could be included in the staff report or resolution for the proposed amendment. For waste discharge requirements, the rationale must be reflected in the findings.

DISCUSSION

A. Legal Analysis

1. Porter-Cologne Water Quality Control Act

Under the Porter-Cologne Water Quality Control Act, Water Code Section 13000 et seq. (Porter-Cologne Act or Act), the State Water Resources Control Board (State Water Board) and the Regional Water Boards are the principal state agencies charged with responsibility for water quality protection. The State and Regional Water Boards (Boards) exercise this responsibility primarily through the adoption of water quality control plans and the regulation of waste discharges which could affect water quality. See Water Code Secs. 1317.0, 13170.2, 13240, 13263, 13377, 13391.

Water quality control plans contain water quality objectives, as well as beneficial uses for the waters designated for protection and a program of implementation to achieve the objectives. Id. Sec. 13050(j). In the absence of applicable water quality objectives in a water quality control plan, the Regional Water Board may also develop objectives on a case-by-case basis in waste discharge requirements. See id. Sec. 13263(a).[1]

When adopting objectives either in a water quality control plan or in waste discharge requirements, the Boards are required to exercise their judgment to "ensure the reasonable protection of beneficial uses and the prevention of nuisance". Id. Se-cs. 13241, 13263; see id. Sec. 13170. The Porter-Cologne Act recognizes that water quality may change to some degree without

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1 The focus of this memorandum is limited to an analysis of the Boards' obligation to consider economics when adopting water quality objectives either in water quality control plans or, on a case-by-case basis, in waste discharge requirements. This memorandum does not discuss the extent to which the Boards' are required to consider the factors specified in Water Code Section 13241 in other situations. Specifically, this memorandum does not discuss the applicability of Section 13241 to the development of numeric effluent limitations, implementing narrative objectives contained in a water quality control plan. Further guidance on the latter topic will be developed at a later date.

causing an unreasonable effect on beneficial uses. Id. The Act, therefore, identifies factors which the Boards must consider in determining what level of protection is reasonable. Id.[2] These factors include economic considerations. Id.[3]

The legislative history of the Porter-Cologne Act indicates that "[c]onservatism in the direction of high quality should guide the establishment of objectives both in water quality control plans and in waste discharge requirements". Recommended Changes in Water Quality Control, Final Report of the Study Panel to the [State Water Board], Study Project--Water Quality Control Program, p. 15 (1969) (Final Report). Objectives should "be tailored on the high quality side of needs of the present and future beneficial uses". Id. at 12. Nevertheless, objectives must be reasonable, and economic considerations are a necessary part of the determination of reasonableness. "The regional boards must balance environmental characteristics, past, present and future beneficial uses, and economic considerations (both the cost of providing treatment facilities and the economic value of development) in establishing plans to achieve the highest water quality which is reasonable." Id. at 13.

2. Senate Bill 919

The Boards are under an additional mandate to consider economics when adopting objectives as a result of the recent enactment of Senate Bill 919. 1993 Cal. Stats., Chap. 1131, Sec. 8, to be codified at Pub. Res. Code, Div. 13, Ch. 4.5, Art. 4. The legislation, which is

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2 Other factors which must be considered include:

(a) Past, present, and probable future beneficial uses of water;
(b) Environmental characteristics of the hydrographic unit under consideration, including the quality of water available thereto;
(c) Water quality conditions that could reasonably be achieved through the coordinated control of all factors which affect water quality in the area;
(d) The need for developing housing within the region;
(e) The need to develop and use recycled water.

3 See also Water Code Section 13000 which mandates that activities and factors which may affect water quality "shall be regulated to attain the highest water quality which is reasonable, considering all demands being made and to be made on those waters and the total values involved, beneficial and detrimental, economic and social, tangible and intangible" (emphasis added).

effective January 1, 1994, amended the California Environmental Quality Control Act, Public Resources Code Section 21000 et seq. (CEQA), to require that, whenever the Boards adopt rules requiring the installation of pollution control equipment or establishing a performance standard or treatment requirement, the Boards must conduct an environmental analysis of the reasonably foreseeable methods of compliance. This analysis must take into account a reasonable range of factors, including economics. For the reasons explained above, the latter requirement is duplicative of existing requirements under the Porter-Cologne Act regarding consideration of economics.

B. Recommendation

The meaning of the mandate to "consider economics" in the Porter-Cologne Act is not entirely clear. It is clear that the Porter-Cologne Act does not specify the weight which must be given to economic considerations. Consequently, the Boards may adopt water quality objectives even though adoption may result in significant economic consequences to the regulated community. The Porter-Cologne Act also does not require the Boards to do a formal cost-benefit analysis.

The Porter-Cologne Act does impose an affirmative duty on the Boards to consider economics when adopting water quality objectives. The Boards probably cannot fulfill this duty simply by responding to economic information supplied by the regulated community. Rather, the Boards should assess the costs of adoption of a proposed water quality objective. This assessment will normally entail three steps. First, the Boards should review any available information on receiving water and effluent quality to determine whether the proposed objective is currently being attained or can be attained. If the proposed objective is not currently attainable, the Boards should identify the methods which are presently available for complying with the objective. Finally, the Boards should consider any available information on the costs associated with the treatment technologies or other methods which they have identified for complying with a proposed objective.[4]

4 See, *for example, Managing Wastewater In Coastal Urban Areas, National Research Council (1993). This text provides data on ten technically feasible wastewater treatment technologies, which can be used to make comparative judgments about performance and to estimate the approximate costs of meeting various effluent discharge standards, including standards for toxic organics and metals.*

In making their assessment of the cost impacts of a proposed objective, the Boards are not required to engage in speculation. Rather, the Boards should review currently available information. In addition, the Boards should consider, and respond on the record, to any information provided by dischargers or other interested persons regarding the potential cost implications of adoption of a proposed objective.

If the economic consequences of adoption of a proposed water quality objective are potentially significant, the Boards must articulate why adoption of the objective is necessary to ensure reasonable protection of beneficial uses. If the objective is later subjected to a legal challenge, the courts will consider whether the Boards adequately considered all relevant factors and demonstrated a rational connection between those factors, the choice made, and the purposes of the Porter-Cologne Act. See California Hotel & Motel Assn. v. Industrial Welfare Com., 25 Cal.3d 200, 212, 157 Cal.Rptr. 840, 599 P.2d 31 (1979).

Reasons for adopting a water quality objective, despite adverse economic consequences, could include the sensitivity of the receiving waterbody and its beneficial uses, the toxicity of the regulated substance, the reliability of economic or attainability data provided by the regulated community, public health implications of adopting a less stringent objective, or other appropriate factors. These factors may also include the legislative directive that a "margin of safety [ ] be maintained to assure the protection of all beneficial uses." Final Report, p. 15 and App. A, p. 59.

If objectives are proposed for surface waters and adverse economic consequences stemming from adoption of the objectives could be avoided only if beneficial uses were downgraded, the Boards should address whether dedesignation would be feasible under the applicable requirements of the Clean Water Act and implementing regulations. See 40 C.F.R. Sec. 131.10. Dedesignation is feasible only for potential, rather than existing, uses. See id. Sec. 131.10(g). If dedesignation of potential beneficial uses is infeasible, the Boards should explain why, e.g., that there is a lack of data supporting dedesignation.[5]

5 It should also be noted that, even if dedesignation of potential beneficial uses is feasible, in the great majority of cases it will not have any significant effect on the selection of a proposed objective. This is so because the proposed objective will be necessary to protect existing beneficial uses, which cannot be dedesignated.

The State or Regional Water Board's rationale for determining that adoption of a proposed objective is necessary to protect water quality, despite adverse economic consequences, must be discernible from the record. This reasoning could be included in the staff report or in the resolution adopting a proposed water quality control plan amendment. When objectives are established on a case-by-case basis in waste discharge requirements, the rationale must be included in the findings.

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STATE OF CALIFORNIA
S.B. 469 TMDL GUIDANCE

A PROCESS FOR ADDRESSING IMPAIRED WATERS IN CALIFORNIA

California State Water Resources Control Board
1001 I Street
Sacramento, California 95814

June 2005

Approved by Resolution 2005-0050

CONTENTS

Companion Documents:

Categorical TMDL Module—Bacteria (draft available)
Categorical TMDL Module—Pesticides (under development)

TABLES

FIGURES

1. INTRODUCTION

Section 303(d) of the Clean Water Act (CWA) contains backstop provisions designed to ensure that all state water quality standards are met. The water quality of many waters of the state is currently unacceptable. The Total Maximum Daily Load (TMDL) program was created by the State Board to implement the requirements of these backstop provisions, consistent with state and federal law, for the purpose of ensuring that water quality standards are attained. The TMDL program is the primary program responsible for achieving clean water where traditional controls on point sources have proven inadequate to do so. The program thus is charged with creating plans that consider all sources and causes of impairment, and allocating responsibility for corrective measures, regardless of sources or cause, that will attain water quality standards.

The goal of this guidance document is to assist the California State Water Resources Control Board (SWRCB) and Regional Water Quality Control Boards (RWQCBs) in addressing impaired waters through actions that are consistent with both national and regional United States Environmental Protection Agency (USEPA) regulations and guidance as well as with state technical, regulatory, and legislative requirements. The guidance should also facilitate a greater understanding of expectations, which can result in improved coordination, consistency, and information exchange among RWQCBs. This document is also intended to provide the public with a better understanding of the process and products associated with the assessment of impaired waters and development of implementation plans to improve them.

Impaired Water: A waterbody that has been determined under state policy and federal law to be not meeting water quality standards. An impaired water is a water that has been listed on the California 303(d) list or has not yet been listed but otherwise meets the criteria for listing. A water is a portion of a surface water of the state, including ocean, estuary, lake, river, creek, or wetland. The water currently may not be meeting state water quality standards or may be determined to be threatened and have the potential to not meet standards in the future. The State of California's 303(d) list can be found at http://www.swrcb.ca.gov/quality.html.

As required by the Clean Water Act (CWA), states are to identify and report to USEPA their water quality-limited waters. These waters are to be identified according to the provisions established in USEPA's Water Quality Management and Planning Regulation at 40 CFR 130.7(b). The identified waters should include those impaired due to point and/or nonpoint sources of pollution and may include threatened good-quality waters. Section 303(d) of the CWA requires each state to maintain a list of impaired waterbodies and revise the list every 2 years. The 2002 list, which is the most current approved list for California, requires the development of plans for addressing impaired waters in over 1,800 waterbody/pollutant combinations. (One waterbody can be listed for numerous pollutants.)

Federal TMDL-related Links

40 CFR 130.7(b)—
http://www.access.gpo.gov/nara/cfr/cfrhtml_00/Title_40/40cfr130_00.html
Section 303(d) of the CWA—
http://www4.law.cornell.edu/uscode/33/1313.html

To support the development of plans for addressing impaired waters, this document includes a description of the recommended phases for identifying actions that will lead to restoration of waterbody conditions and the ultimate removal of the impaired water designation. The phases, which are consistent with current state and regional tracking methods, are:

1. Project Definition (Chapter 2)
2. Project Planning (Chapter 3)
3. Data Collection (Chapter 4)
4. Project Analyses (Chapter 5)
5. Regulatory Action Selection (Chapter 6)
6. Regulatory Process (Chapter 6)
7. Approval
8. Implementation (Chapter 7)

References to Additional Information in the Appendices

Throughout the document, icons are included to identify areas relating to additional information contained in appendices.

Areas where templates are available are identified by:

Areas where an issue paper provides expanded discussion are denoted by:

Topics with relevant legal memos are denoted by:

At each phase, the suite of options available to address impaired waters can be considered by following the iterative decision process presented in this document. The process for addressing impaired waters is presented as a science-based methodology, beginning with the formulation of a conceptual model that serves as the technical plan for projects and as the baseline from which the technical approach can be adapted as scientific investigations provide new data and information. Throughout this process the focus is on identifying actions that can result in the successful restoration of impaired waters, while continuously adapting to new information and evolving science. The concept of adaptive management is recognized in the impaired waters process, and new data, analysis results, and post-implementation monitoring can result in recommendations for reassessment, revised TMDL calculations, and updated implementation plans. Although the specifics of each project will vary, the analyst should recognize that each phase in the process has the potential to become incrementally more detailed and focused and that circumstances may arise that will dictate the need for further examination of data, analyses, and input from involved and interested parties. To better communicate these concepts, the information in this document is presented as discrete prescriptive steps. In reality, each of the RWQCBs will have wide latitude and numerous options, as well as some legal constraints, when determining how to address impaired waters.

Delist. To remove an impaired water from the state's 303(d) list through a formal action and approval by USEPA. The process typically involves submitting the state list to USEPA.
Total Maximum Daily Load (TMDL). A numerical calculation of the loading capacity of a water body to assimilate a certain pollutant and still attain all water quality standards. The sum of the individual wasteload allocations (WLAs) for point sources, load allocations (LAs) for nonpoint sources and natural background, and a margin of safety (MOS). TMDLs can be expressed in terms of mass per time, toxicity, or other appropriate measures that relate to a state's water quality standards.
Site-Specific Objectives (SSO). Objectives that reflect site-specific conditions. An SSO may be appropriate when it is determined that promulgated water quality standards or objectives are not protective of beneficial uses or when site-specific conditions warrant more or less stringent effluent limits than those based on promulgated water quality standards or objectives, without compromising the beneficial uses of the receiving water.
Use Attainability Analysis (UAA). A structured scientific assessment of the factors affecting the attainment of a water's designated use, including physical, chemical, biological, and economic factors (e.g., naturally occurring pollutant concentrations, human-caused conditions or sources of pollution, hydrologic modifications, and physical conditions related to the natural features of the waterbody).

1.1. Regulatory Background

Section 13001 of the California Water Code identifies the SWRCB and all RWQCBs as the principal state agencies responsible for the coordination and control of water quality. The SWRCB and RWQCBs are expected to conform to and implement the policies of the Water Code and coordinate their respective activities to achieve a unified and effective water quality control program in the state. The Water Code also authorizes the SWRCB to adopt statewide water quality control plans and requires each RWQCB to develop and adopt Basin Plans that address all areas in the region and conform to state water quality policy. (Appendix A includes additional information on basin planning).

Each regional Basin Plan includes:

- Identification of existing and potential beneficial uses.
- Identification of water quality objectives (WQOs).
- Implementation programs to achieve the WQOs.

Senate Bill 469 was enacted in April 2002 to add Section 13191.3 to the Water Code. The addition requires the SWRCB, on or before July 1, 2003, to prepare guidelines to be used by the SWRCB and the RWQCBs for the purpose of listing and delisting waters and developing and implementing the Total Maximum Daily Load (TMDL) program and calculating TMDLs pursuant to Section 303(d) of the federal CWA. In general, Section 303(d) of the CWA requires each state to establish TMDLs for waters within its boundaries for which certain effluent limitations are not stringent enough to achieve applicable water quality standards. A TMDL is the maximum amount of a pollutant that a waterbody can assimilate while still meeting water quality standards. While the implementation plan for a TMDL may involve a modification of the applicable water quality standards, a TMDL itself is not a component of California's water quality standards. (Appendix B includes a legal memo concerning the difference between WQOs and a numeric target used in a TMDL.)

Regulatory Links

California Water Code—http://www.leginfo.ca.gov/cgi-bin/calawquery?codesection=wat&codebody=&hits=20

Porter-Cologne Water Quality Control Act (California Water Code, Division 7. Water Quality [CWC Sections 13000–14958])—http://www.swrcb.ca.gov/water_laws/docs/portercologne2003.pdf

Regulatory Actions

RWQCBs have wide latitude, numerous options, and some legal constraints that apply when determining how to address impaired waters. Irrespective of whether Section 303(d) of the CWA requires a TMDL, the process for addressing waters that do not meet applicable standards will be accomplished through existing regulatory tools and mechanisms. Chapter 6 provides a more detailed discussion of regulatory action options.

A summary of the regulatory options for addressing impaired waters is provided in Figure 1-1. In most cases, it will require implementation of a pollution reduction strategy of some sort. However, if a listed waterbody is neither impaired nor threatened, the appropriate regulatory response would be to remove the waterbody from the list (to delist). Likewise, if the water quality standards is are not being achieved because the applicable standards are not appropriate, an appropriate regulatory response may be to correct the standards through mechanisms such as use attainability analysis (UAA), a site-specific objective (SSO), or other modification of the water quality standard. In addition, an antidegradation finding may authorize the lowering of water quality to some degree, which may address the impairment. What constitutes an inappropriate standard is discussed more fully in Appendix C, but the discussion here should not be construed as implying that standards may be changed as a convenient means of "restoring" waterbodies. To the contrary, federal and state law contain numerous detailed requirements that in many cases would prevent modification of the standards especially if it would result in less stringent controls. Modification of standards may be appropriate however, to make uses more specific, to manage conflicting uses, to address site-specific conditions, and for other such reasons. If, subsequent to evaluation of standards, the water does not meet revised WQOs, a TMDL calculation might be required.

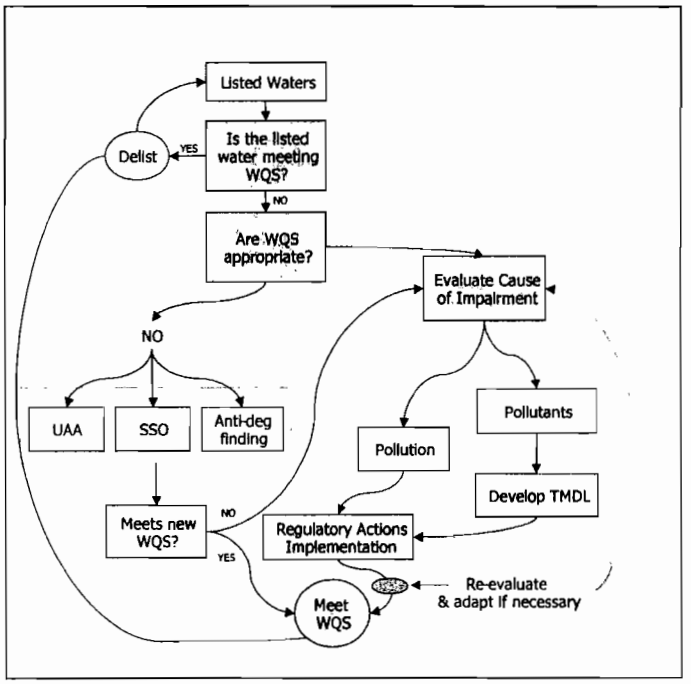


Figure 1-1. Regulatory Options Summary

Common causes or categories of impairment are related to anthropogenic factors. They include waters impaired by certain USEPA-designated pollutants and waters impaired by other forms of pollution. The Porter-Cologne Water Quality Control Act charges the SWRCB and the RWQCBs with the responsibility of protecting the beneficial uses and quality of all waters of the state, irrespective of the cause of the impairment. The federal requirement to calculate TMDLs for listed waters is limited to those pollutants that USEPA determines are suitable for such calculation. Although USEPA's current position is that all

pollutants are suitable under proper technical conditions, as the complexity of many pollutant-based impairments becomes more apparent, it is possible that USEPA will exclude certain pollutants from the TMDL requirement in the future (see definitions in box below).

Pollutants. The term *pollutant* is defined in Section 502(6) of the CWA as "dredged spoil, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt and industrial, municipal, and agricultural waste discharged into water" (http://www4.law.cornell.edu/uscode/33/1362.html).

Pollution. The term *pollution* is defined in Section 502(19) of the CWA as the "man-made or man-induced alteration of the chemical, physical, biological, and radiological integrity of water" (http://www4.law.cornell.edu/uscode/33/1362.html). The term *pollution* thus includes impairments caused by discharges of pollutants. *Pollution* is also defined in Section 13050(l) of the California Water Code as an alteration of the quality of the waters of the state by waste to a degree that unreasonably affects either the waters for beneficial uses or the facilities that serve these beneficial uses (http://www.leginfo.ca.gov/cgi-bin/displaycode?section=wat&group=13001-14000&file=13050-13051).

Subject to available resources, all violations of standards may be addressed using any combination of existing regulatory tools. Existing regulatory tools include individual or general waste discharge requirements (whether they are National Pollutant Discharge Elimination System [NPDES] permits or requirements solely under California law), individual or general waivers of waste discharge requirements, enforcement actions, interagency agreements, regulations, Basin Plan amendments, and other policies for water quality control. Basin Plan amendments can include implementing a specific water quality control plan, adopting prohibitions, or (where appropriate) modifying standards. The priority ranking assigned to an impaired water will help the RWQCBs determine priorities for addressing the impairments. Some of the key factors in determining the most appropriate regulatory option(s) are listed below. (For specific details see Chapter 6.)

- *Multiple actions of the RWQCB*: If multiple actions by the RWQCB are required, the solution must be implemented through a Basin Plan amendment or other regulation.
- *Single Vote of the RWQCB*: If the solution can be implemented with a single vote of the RWQCB, it may be implemented by that vote. When an implementation plan can be adopted in a single regulatory action, such as a permit, a waiver, or an enforcement order, there is no legal requirement to first adopt the plan through a Basin Plan amendment.
- *Regulatory Action of Another State, Local, or Federal Agency*: If the RWQCB finds that a proposed solution will correct the impairment, the RWQCB may certify that the regulatory action will correct the impairment and, if applicable, implement the assumptions of the TMDL, in lieu of adopting a redundant program.
- *Nonregulatory Action of Another Entity*: If the RWQCB finds that the action will correct the impairment, the RWQCB may certify that the nonregulatory action will correct the impairment and, if applicable, implement the assumptions of the TMDL, in lieu of adopting a redundant program.
- *Voluntary Actions by Nonregulatory Entities*: Such actions are appropriate if the RWQCB makes findings, supported by substantial evidence in the project record, that a program being implemented by a nonregulatory entity will be adequate to correct the impairment.

Process for Calculating TMDLs in California

TMDLs are generally adopted at the time programs are instituted to implement actions to correct an impairment. TMDLs may be adopted in any of the following ways: as part of a Basin Plan amendment, in the assumptions underlying a permitting action, in an enforcement action, or in another single

regulatory action that is designed by itself to correct the impairment. The TMDL is adopted with the regulatory action that implements it. The manner of SWRCB review of the plan or program will depend upon and be consistent with the manner in which the RWQCB has adopted the TMDL. The TMDL is transmitted to the USEPA with a Request for Approval.

TMDL Definitions

The following definitions are drawn from 40 CFR Part 130 (http://www.access.gpo.gov/nara/cfr/cfrhtml_00/Title_40/40cfr130_00.html).

Loading Capacity (LC). The greatest amount of loading that a water can receive without violating water quality standards (40 CFR 130.2(f)). The LC equals the TMDL.
Load Allocation (LA). The portion of a receiving water's loading capacity that is attributed either to one of its existing or future nonpoint sources of pollution or to natural background sources (40 CFR 130.2(g)).
Waste Load Allocation (WLA). The portion of a receiving water's loading capacity that is allocated to one of its existing or future point sources of pollution. WLAs constitute a type of water quality-based effluent limitation (40 CFR 130.2(h)).
Margin of Safety (MOS). A required component of the TMDL that accounts for the uncertainty about the relationship between the pollutant loads and the quality of the receiving waterbody (40 CFR 130.7(c)(1)).

1.2. Structure of this Document

This guidance document has been organized to be consistent with water quality regulations in California and current tracking of state progress in addressing impaired waters. Figure 1-2 identifies the key phases and associated major sections of the document. The remainder of this document is organized into the following chapters:

- ***Chapter 2*** describes the development of the Project Definition, the first step in planning a strategy for addressing impaired waters.
- ***Chapter 3*** provides guidance on the development of the Project Plan, including a scope of work, identifying and allocating adequate resources to complete the project, scheduling interim and final milestones and important dates, assessing constraints, and reviewing ongoing activities and stakeholders in the analysis area.
- ***Chapter 4*** discusses the planning and collection of monitoring information in support of the project.
- ***Chapter 5*** provides guidance on the Project Analyses phase, including selection of technical approach, analysis of data, options for presentation and interpretation of analyses, documentation, and report preparation.
- ***Chapter 6*** provides guidance on the decision process for selecting regulatory actions that can be initiated to address the impaired water. The legislative and administrative requirements associated with regulatory actions are described.

- ***Chapter 7*** discusses the development of implementation plans and provides information on including adaptive implementation concepts into implementation monitoring and tracking.
- ***Appendix A*** presents a checklist of the steps in the Basin Planning process.
- ***Appendix B*** provides copies of TMDL-related legal memorandums issued by SWRCB's Office of Chief Counsel.
- ***Appendix C*** presents an issue paper on UAAs and SSOs.
- ***Appendix D*** provides report templates for a Delisting Memo, Project Plan, Report Tracking Sheet, and TMDL Report.
- ***Appendix E*** presents case studies to highlight different approaches for addressing impaired waters. (Case studies will be added as relevant TMDLs are approved by the SWRCB.)
- ***Appendix F*** contains guidance on stakeholder involvement in the impaired waters process.

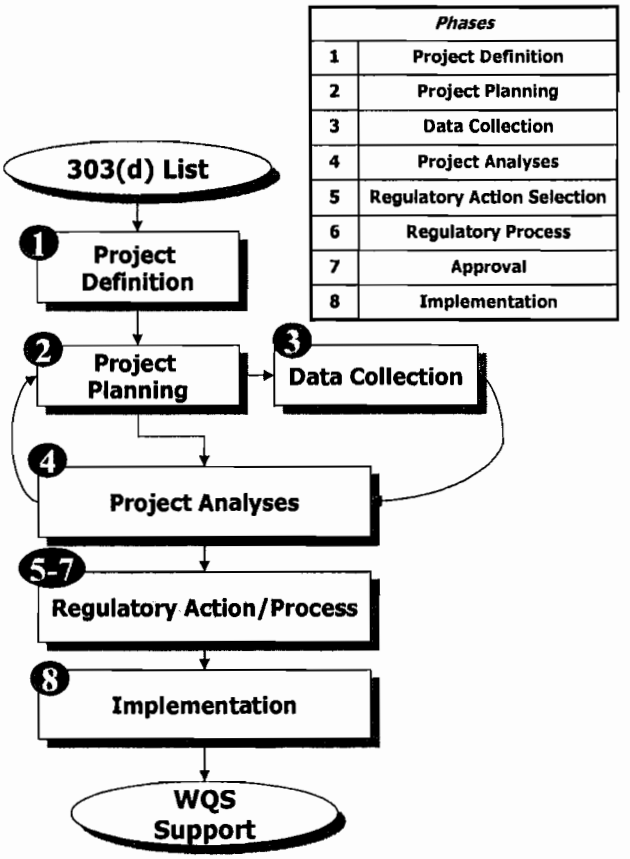


Figure 1-2. Impaired Water Assessment Phases

Each section of the document builds on the previous sections to highlight the incremental process of building on evaluations and more detailed data analysis. Supplementing this document are a series of more in-depth issue papers and categorical (i.e., pollutant-specific) technical guidances. As the list of supporting documents will continue to expand over time, readers are encouraged to check the Web link periodically. http://www.waterboards.ca.gov/tmdl/tmdl.htmlPractitioners should always look ahead to the regulatory and implementation actions (and even beyond, e.g., implementation plans) that might be employed in achieving the goal of restoring waters and meeting water quality standards.

2. PROJECT DEFINITION

> ***Project Scope.*** One or more impaired waters and one or more causes grouped in a geographic area, typically within one drainage area or watershed. The grouping of multiple impaired waters facilitates the development and execution of a plan to address the impaired waters.

The goal of the Project Definition stage is to outline a strategy for addressing one or more impaired waters. The strategy identifies the key activities that will be performed in subsequent stages of the analyses. The project definition is based on a *preliminary* review of available information describing the nature of the impairment. This abbreviated review is used to develop an *initial* hypothesis of the causative factors and a strategy for the analysis and ultimate management approach. The hypothesis might be revised at any time during the impaired waters process based on new information or analysis. Ultimately, the project definition not only supports understanding of the impairment; it also provides an essential precursor to the design of the project plan, which will establish the project scope, additional data gathering needs, analysis approaches, and stakeholder involvement techniques.

Data compilation and review are focused on the information relevant to building an understanding of the water quality impairment of the waterbody. The time spent on the project definition development process will also depend on the complexity and size of the project (number of water(s), cause(s)). Consideration of this information can better guide impaired waters planning, analysis, assumptions, and expected outcomes. The examination of information can be organized into three general steps, as shown in Figure 2-1 and described below:

- Compile basic information
- Analyze data
- Develop the preliminary project definition

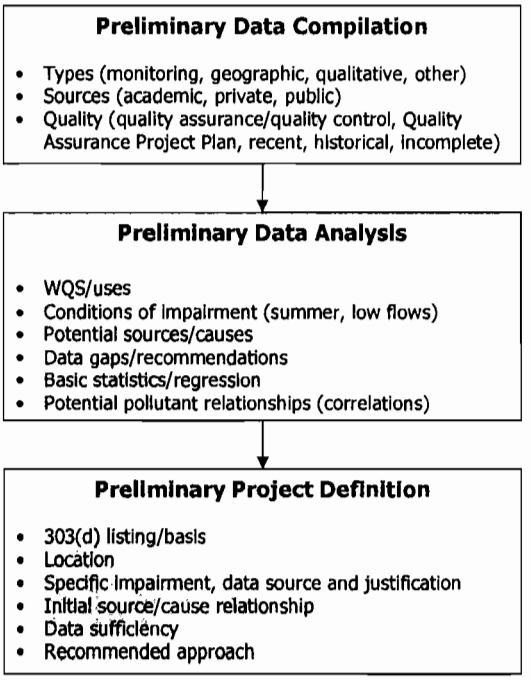


Figure 2-1. Steps in Derivation of Project Definition

2.1. Preliminary Data Compilation

This step entails a preliminary examination of what relevant data are available to describe the nature of the impairment. Consideration should be given to organizing the data and information inventory using a spreadsheet or database. The following lists of questions and data needs are intended to provide a basic understanding of the types of information often used in the analyses of impaired waters. They do not represent the minimum elements for a given project type, nor are they intended to be comprehensive.

- *Why is the water listed?*
  - Determine the water quality standards impairment that placed the water on the state 303(d) list

- Identify data sources and rationale supporting the determination of a standards violation
- Consider whether the conditions leading to listing have changed (e.g., remediation, restoration, new data collection)

What types of data and information are available?

Monitored:

- Current/historical chemical, biological, and physical monitoring data
- Previous watershed or water quality analyses
- Flow and runoff information
- Meteorological data
- Point source monitoring data
- Flow alteration or diversion information

Geographic:

- Maps of the watershed, point and nonpoint sources (See sample project map in Figure 2-2.)
- Waterbody size and shape information
- Tributary locations and characteristics
- Current, historical, and potential future land uses
- Soil surveys and geologic information
- Topographic information
- Monitoring locations
- Point source locations

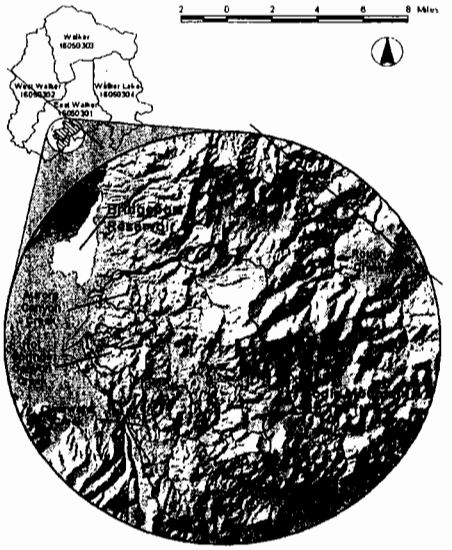


Figure 2-2. Sample Project Location Map

Regulatory:

- Existing programs
- Applicable water quality standards
- Discharge permits
- Past enforcement actions
- Existing regulatory and voluntary pollutant control programs

Qualitative:

- Agency personnel or local contacts who may have an initial understanding or hypothesis regarding the causes or sources of impairment
- Anecdotal information on the waterbody conditions (e.g., citizen complaints)
- Stakeholder meetings as a means to support information gathering and to brief the public on project

What are the sources for gathering available data?

- Public agencies (e.g., USEPA, U.S. Geological Survey [USGS], RWQCB, 319-funded group, volunteers, local contacts)
- Academic institutions
- Private (e.g., utilities, industry, citizens' groups)
- Published peer-reviewed scientific literature and gray literature produced by other agencies (e.g., U.S. Forest Service)

- *What are the data quality considerations?*
  - Were the available data collected under a Quality Assurance Project Plan (QAPP)
  - Is the data set complete/incomplete?
  - When were the data collected?

2.2. Data Analysis

In Step 2 a brief analysis is performed to support the formulation of the analyst's understanding of the waterbody conditions and the potential sources of impairment. The level of effort dedicated to this analysis should be commensurate with the desired product—a basic understanding of the conditions. As a general rule, no more than 2 weeks should be invested in this step. Questions considered in the Step 2 analysis are

- *What are the designated use(s) and impairment(s) associated with the listing?*
  - List the beneficial use(s) for the impaired segment(s), describe the designated uses being affected, and document the WQOs (narrative or numeric) or antidegradation concerns related to the identified impairment. (Appendix B includes a legal memo concerning the difference between WQOs and a numeric target used in a TMDL.)

- *Under what conditions is the impairment observed?*
  - Dry or wet season?
  - Rain on snow events?
  - High- or low-flow seasons?
  - Uniform throughout the year?

- *What are the potential sources contributing to the impairment?*
  - Pollutant source summary (nonpoint and point sources).
  - When does loading occur?
  - How do pollutants enter the waterbody (i.e., runoff, point sources, contaminated ground water, land uses, ineffective point source treatment, pipe failures, or bypasses around a sewer line)?
  - If possible, create a schematic conceptual model—visual guide—of watershed processes and sources.

- *What are the major data gaps?*
  - Are the data sufficient for the expected analysis (i.e., to evaluate current conditions and spatial and temporal trends, to use in model development)?
  - Is the data set relatively complete for all constituents?
  - Will additional data need to be collected?
  - What recommendations should be made for additional data collection?

- *Does examination of the data show any obvious relationships?*
  - Are there any obvious correlations? Performance of selected statistical analysis in key locations may identify problem areas and clarify the degree of impairment.

- *What characteristics of the waterbody and/or watershed could be affecting the impairment?*
  - Current/future growth, increases in industrial areas, future NPDES permits, residence time, reservoir/lake depth, mixing zones, seasonal cottage/home use (i.e., increased use in septic systems).

- *What types of management measures might be considered to restore the impaired water?*
  - Types of management measures and management practices for point and/or nonpoint sources.
  - Considerations for uncontrollable sources—UAA, SSO, variance in standards (seasonality), finding to authorize allowable degradation.
  - Ongoing watershed protection efforts (e.g., current mine reclamation projects or close-out plans).
  - Potential coordination with other agencies or related watershed studies.
  - Potential issues associated with constraints on water supply and water rights in the watershed or potential implementation measures.

2.3. Preliminary Project Definition

Based on the preliminary data review and analysis, a project definition is drafted describing the following:

- **303(d) listing location and pollutant(s):** Brief description of the location of the watershed, the extent of the listing, the appropriate standards, and the pollutants to be addressed.
- **Basis of listing:** Brief narrative of the data and information used as the basis for listing the waterbody as impaired.
- **Key pollutant sources:** Narrative on known and expected pollutant sources in the watershed.
- **Working hypothesis regarding cause of impairment:** If known, identify the likely causes of the impairment.
- **Analysis strategy:** Brief description of the strategy, if known, for assessing the impairment. For example, state whether the analysis will be limited to low-flow conditions and a spreadsheet model will be used.
- **Management techniques:** Discussion of potential management practices and additional investigation that might be required.

As new information is gathered in subsequent stages of the impaired waters process, the project definition should be revised accordingly. The box below provides an example of a project definition that was subsequently revised based on additional data collection and analysis.

Project Definition Example

The following provides a hypothetical example of a situation where the project definition was revised as new information provided a better understanding of the sources and impairment conditions. The example illustrates the dynamic nature of the problem definition, with its revision and enhancement occurring throughout the ongoing analytical process.

The Canyon Creek watershed is approximately X mi² and is dominated by rangeland and forest. The watershed is almost entirely Forest Service lands (99%), with very little privately held lands (<1%). Canyon Creek is listed on the 303(d) list of waters not meeting water quality standards because of nuisance growths of algae. The coldwater aquatic life designated use is not fully supported because of excess plant growths (algal growth). The creek appears to be experiencing elevated nutrient concentrations resulting in nuisance growths of algae. This appears to violate the narrative water quality objective for nutrients, which prohibits discharges of biostimulatory substances in concentrations that cause nuisance or adversely affect beneficial uses. Based on historical monitoring, the primary sources of excess nutrients causing the impairment were identified as grazing, removal of riparian vegetation, and streambank destabilization. Additional data gathering is recommended to verify the impairment and quantify the source contributions.

The project plan was developed and implemented. Additional monitoring data were collected in Canyon Creek during late spring and summer to verify the impairment listing, evaluate the potential sources, and determine the level of current algal growth in the stream. Since there were no numeric standards for plant nutrients, an assessment for nutrient overenrichment was made, including an algal bioassay. Using this information, a numeric target for algal productivity was established for this stream. This target was based on a USEPA moderate level productivity criterion for algal growth based on algal bioassays.

Analysis of the data indicated that a naturally occurring source, a spring, was the largest contributor of nutrient loading to the stream. Road maintenance/runoff was identified as another source in addition to the expected sources of rangeland, removal of riparian vegetation, and streambank destabilization.

The project definition was revised in the final project report as follows (the revised text is underlined):

The Canyon Creek watershed is approximately X mi² and is dominated by rangeland and forest. The watershed is almost entirely Forest Service lands (99%), with very little privately held lands (<1%). Canyon Creek is listed on the 303(d) list of waters not meeting water quality standards because of nuisance growths of algae. The coldwater aquatic life designated use is not fully supported because of excess plant growths (algal growth). <Revised text> This violates the narrative water quality objective for nutrients, which prohibits discharges of biostimulatory substances in concentrations that cause nuisance or adversely affect beneficial uses. Creek has high nutrient concentrations resulting in nuisance growths of algae. Excessive algae growth is impairing the high quality coldwater fishery use. The nutrient concentrations in the creek are naturally high due to a spring, but anthropogenic sources identified in the 2001 monitoring provide additional nutrient inputs that stimulate algal growth. Management of road maintenance/runoff, rangeland, removal of riparian vegetation, and streambank destabilization is expected to meet the moderate level productivity criterion for the algal growth target in the creek, which will result in meeting water quality objectives.

The new project definition resulted from the technical analysis that identified the presence of a naturally occurring source, as well as road maintenance/runoff issues. The resulting TMDL recognizes natural conditions and road maintenance/runoff in the allocation of nonpoint sources.

3. PROJECT PLAN

Once the project definition phase has been completed, a clear and coherent plan to complete the project must be designed. The objective of the project plan is to map the project from start to finish, detailing specific objectives, available resources, constraints, project tasks, interim milestones, and project deadlines. The scope of work (or project plan) will guide project efforts through completion of the project. The project plan will need to be updated if new information or analysis requires modifying the course of action.

3.1. Project Task Selection

Before planning the project, the project definition should be reviewed to gain familiarity with the location, the nature of the waterbody impairment, the watershed characterization, the basis for the 303(d) listing, the preliminary data assessment, and the preliminary objective of the project. The goal of the review of the project definition should be to determine whether the waterbody is attaining water quality standards or whether more data collection is needed to make this determination. In support of the project planning phase, a slightly more detailed compilation and review of data can be performed so that the scope of the project can be more accurately defined. Based on the findings of the data review, the analysis may follow a path consistent with one of the three regulatory tracks listed below and in Figure 3-1:

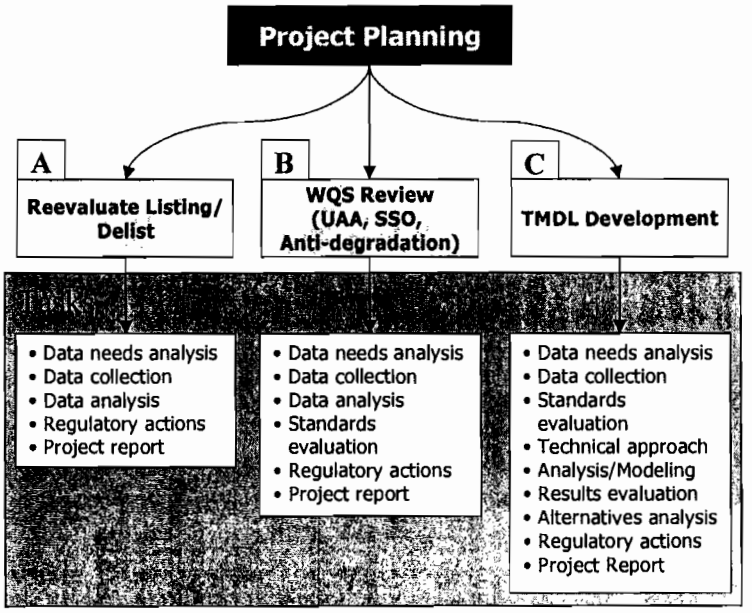


Figure 3-1. Task Selection Process

A. Water quality standards (WQS) may currently be supported, or a determination of the condition cannot be made, and further data collection is needed.
B. Additional data review or observations subsequent to listing indicate that a standards-related action will be needed (UAA, SSO, Anti-degradation). Appendix C includes an issue paper on UAAs and SSOs.
C. A corrective action, such as a TMDL, will be required.

Other tracks or combination of tracks might be desired depending on the circumstances. As data are collected and analyzed, or more detailed modeling analyses are performed, the initial selection of the regulatory track can be revised accordingly. Selection of regulatory track A, B, or C will likely dictate the types of analytical tasks needed. Table 3-1 lists the typical tasks and their relevance to each of the

regulatory tracks. These generalized tracks are intended to provide some structure to these analyses, but they should not be accepted as the only or even the preferred tracks. It is likely that many analyses will start as Track A and will end up as Tracks B, C, or a combination.

Table 3-1. Typical Subtasks in the Project Analyses Phase

Track A	Track B	Track C
☐ Statistical analysis of monitoring data ☐ Collection of additional monitoring data ☐ Interpretation and assessment of the existing standards	☐ Statistical analysis of monitoring data ☐ Evaluation of monitoring methods, detection limits, and laboratory analysis ☐ Evaluation of multiple endpoints ☐ Interpretation and assessment of the existing standards	☐ Watershed delineation ☐ Watershed loading assessment/modeling ☐ Watershed calibration/validation ☐ Receiving water model setup ☐ Bathymetry input ☐ Receiving water model calibration/validation

Track A has an abbreviated task list, because the focus is on confirmation of the impairment through monitoring and/or additional or more detailed data analyses. One possible reason for pursuing this track is that management of sources or illicit discharges might have resulted in restoration of water quality standards. If the data collection or analysis confirms that the waterbody is in compliance with WQS, the appropriate regulatory action may be the delisting of the waterbody. If the additional data or analyses confirm that the impairment still exists, the Project Plan should be modified to reflect the need to follow Track B, C, or both.

Although all tracks share similar tasks, the specific analyses recommended will vary depending on the goal of the analyses or the type of regulatory action pursued. In Track C (development of a plan to correct the impairment), the analyses will be specifically defined by the technical approach selected. If a TMDL is required for the project, it will be calculated by following Track C.

3.2. Evaluation of Needs

Performance of each identified task will require investment of staff or contractor resources, specialized skills, and time. Examination of each task can help identify the full list of supporting resources that would be needed to achieve project objectives. Preparing a full list of potential needs can help in formulating options when realistic constraints are imposed by schedules and budget limitations. It is important to recognize that the level of effort required for each project might vary considerably based on factors such as watershed/waterbody complexity, source types, stakeholder and public interest, and cost of implementation.

An example of a needs analysis for a single pollutant (bacteria) TMDL project (Track C) is shown in Table 3-2. Note that the staff expertise listed in the table represents the optimal mix of skills for a TMDL analysis project and that in reality very few projects will have access to these skills. The purpose of the table is to help anticipate the typical level of effort and the need to build a multidisciplinary team to support the analysis. In most cases, RWQCBs will not need these skills for each project, but consideration of the technical resource pool (within the RWQCB or statewide) might prove useful when questions or technical needs arise.

Table 3-2. Sample Needs Analysis for a Bacteria TMDL Project

Task (Phase)	Desired Skills for Analyses	Level of Effort[a] Hours	Products
Project Definition (1)	Scientist/Engineer	20-60	Project Definition Statement
Project Plan (2)	Scientist/Engineer Biologist Statistician Monitoring expert	8-16 8-16 4-40 0-60	Project Plan
Stakeholder Involvement	Public outreach specialist Various technical staff as needed	80+ TBD	Ongoing Meetings/Briefing Materials
Data Collection & Analysis (3)[a]	Scientist/Engineer GIS technician	40-100 20-40	Progress Report Study Reports
Technical Approach (4)	Scientist/Engineer	32	Preliminary Project Report(s)
Analysis/Modeling (4)	Scientist/Engineer GIS technician	240-320 20-40	
Alternatives Analysis (4)	Scientist/Engineer	60	
Regulatory Actions (5)	Scientist/Engineer Legal reviewer[b]	16 16	Project Report
Regulatory Process (6)	Scientist/Engineer Public outreach specialist Legal reviewer[b]	TBD	Basin Plan Amendment or Other Regulatory Action
Regulatory Approvals (7)	Scientist/Engineer Legal reviewer[b]	TBD	SWRCB, Office of Administrative Law, USEPA Approval
Implementation (8)	NPS/Agricultural policy expert Scientist/Engineer	80 40	Ongoing Progress Reports (Post-Approval)

TBD = To be determined.

[a] Assumptions: No additional monitoring.
Available bacteria sampling and flow gauging.
Hydrologic Simulation Program-FORTRAN (HSPF)-based modeling approach.
Limited-complexity watershed (10 to 20 subwatersheds).

[b] Legal review will depend on type of regulatory option selected.

3.3. Assessment of Available Resources and Constraints

After specifying the needs to complete the identified tasks and actions, an assessment of the available resources and potential constraints must be made. Determining the available resources and potential constraints can significantly impact the scope of work and the specific tasks and technical approaches identified. Figure 3-2 illustrates the relationship between the needs (objectives/tasks) and the resources and constraints. The project needs will be reevaluated based on evaluation of the resources and constraints and the final project plan will reflect the resolution of the needs and constraints analyses. The checklist below provides categories of resources and constraints that should be considered in defining the project plan:

- **Data**
  - What amount and types of data are appropriate?
  - Do additional data need to be collected?

- How will additional data collection impact the project schedule?
- Do the data need to be converted from hard copy, manipulated, or re-formatted?
- Will existing data be difficult to compile?

Technical

- What is the level of complexity associated with the technical approach?
- Are the technical resources available in-house?
- Does the technical approach require specialized computer hardware or software?
- Can the technical approach demonstrate that the action will result in meeting applicable water quality standards?
- Have similar projects been completed? If so, can these be used as examples?

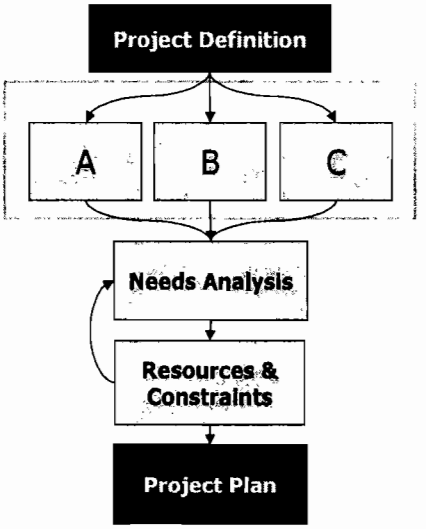


Figure 3-2. Iterative Planning Process

Monetary

- Given the necessary level of effort expected to complete the project, what is the cost in terms of person-years (PYs)?
- If expertise outside the agency is needed, what is the expected cost?
- What is the estimated cost of the project?
- What is the budget for the project?
- Can all tasks identified for the project be completed using the existing budget?

Staff

- How many staff members are potentially available to work on the project?
- What current obligations do staff members have?
- What skills do existing staff members have? Are these consistent with the project requirements?
- Is outside expertise needed?

Time

- Are there Consent Decree or lawsuit-related deadlines?
- What is the state's scheduled date for completion of the impaired waters analyses?
- What length of time is required for the review and approval process for the anticipated regulatory options? How will this impact the project?

Stakeholders

- What level of stakeholder involvement is appropriate?
- What are the key milestones where stakeholder meetings are needed or recommended?
- How can stakeholder resources be leveraged to assist the project?

Depending on the scenario, the specific resources and constraints may vary; however, the objective should be to determine what level of complexity is achievable given the level of resources and constraints. For instance, if more data collection is needed, funding resources may limit the extent of the effort. Or, perhaps data are not sufficient to support using a very complicated watershed/water quality model to calculate TMDLs or determine corrective actions. The above questions should help specify resources and constraints.

3.4. Identification of Interim Milestones, Project Timeline, and Tracking Options

To effectively control the project and ultimately ensure the project's success, a project performance timeline should be developed. In addition, interim milestones should be identified to provide a means for tracking the progress of the project. At a minimum, milestones should be consistent with the phases identified in Table 3-3.

Table 3-3. Phases of California's Impaired Water Process

Phase	Description	Product(s)
1	Definition of project, pollutant(s)/waterbody(s), justification.	Project Definition
2	Compile existing information, identify data needs, develop study plans, and engage stakeholders.	Project Plan
3	Data collection and analyses	Progress Report(s) Study Report(s)
4	Project report(s) w/ data and analysis findings. May include impairment assessment, source and loading analysis, implementation alternatives.	Preliminary Project Report(s)
5	Develop recommendations for regulatory action and compile results/findings.	Project Report (Phases 2-4 Inclusive)
6	RWQCB regulatory action process. May include workshop(s), hearing(s), and referral back to staff.	Basin Plan Amendment or Other Regulatory Action (e.g., Permit)
7	Regulatory approval	SWRCB, Office of Administrative Law, USEPA Approval
8	Implementation	Clean water

Interim milestones can be based on the specific tasks and actions that must take place to complete the project. For instance, the first milestone could occur following completion of the data compilation, analysis, and gap assessment. The second milestone could occur once the watershed/water quality model has been developed. Tracking milestones then provide a basis on which to judge the progress of the report and time needed to complete the project.

The project timetable specifies the overarching time period during which the project tasks occur. The interim milestones ensure that specific tasks are being accomplished. Interim milestones may need to be periodically revised. Together, the project timeline and interim milestones can also help to determine budget and resource requirements.

To construct the project timeline, the project's start and completion dates should be determined. Specific dates for the tasks, objectives, and interim milestones can be determined by working backwards from the completion date. Based on the intended regulatory action, sufficient time for unanticipated challenges can be built into the process. Multiple timelines can be developed if the specific regulatory action is not yet determined. A sample schedule for a Track C project is shown in Table 3-4 below.

Table 3-4. Sample 2-Year Schedule for Simplified Track C Project

Task (Phase)	Quarters (3-month increments)							
	1	2	3	4	5	6	7	8
Project Definition (1)								
Project Plan (2)								
Stakeholder (All) Involvement [a]	✓		✓		✓	TBD		
Data collection and analysis (3)[b]								
Technical Approach (4)								
Analysis/Modeling (4)								
Alternatives Analysis (4)			*Draft Reports*					
Regulatory Actions (5)	*Final Report*				TBD			
Regulatory Process (6)					TBD			
Regulatory Approvals (7)					TBD			
Implementation (8)					Follow-up TBD			

[a] Minimum recommended stakeholder meetings; remaining meetings dictated by regulatory options selected.
[b] Assumes no monitoring or additional data collection.

3.5. Development of the Project Plan

The product of this phase is the Project Plan document. Development of the final project plan requires resolving the needs (section 3.2), resources and constraints (section 3.3), and the project timetable (section 3.4.) Figure 3-2 illustrates the iterative process of reconciling the needs and the constraints placed on the project. The constraints often require a reassessment of the needs and the project approach. Several strategies can be employed to increase efficiency or optimize the use of available resources to meet the needs of the project.

- **Staff Sharing.** Identify and allocate staff resources for specialty skills across RWQCBs, and other state and federal agencies.
- **Outsourcing.** Identify key tasks that can be performed by technical experts or specialists in academia or the private sector.
- **Other sponsors**. Identify stakeholders willing to commit technical staff resources or financial resources to support data gathering or analysis. Other sponsors may include industry, specialty groups, and nonprofit agencies. Crafting an agreement with a local sponsor should consider the level and timing of commitment and the protection of the unbiased scientific and policy decision process of the RWQCB.

In reconciling needs and resources, another consideration is the phasing of the project in relation to other projects. While examining strategies for performing the project analysis, options for sharing common tasks between projects can also be considered. Analysis efficiencies can be realized by a larger grouping of projects within watersheds or regions, sharing specific tasks between projects, phasing projects to build technical skills or libraries, or identifying common technical and research needs that can benefit multiple projects. Some general efficiency ranges are shown in Table 3-5—these ranges represent estimates based on past experience developing and reviewing TMDLs and national costing studies conducted to support state and federal regulation development.

Grouping within a watershed is more efficient because data compilation and outreach activities are shared. Similar pollutants (e.g., nutrients) are likely to result in combined modeling techniques (e.g., nutrient, algal modeling). Unrelated pollutants are less likely to provide significant saving since their behavior is different, sources may vary, and analysis cannot be efficiently combined. Adjacent watersheds may offer some logistical efficiency (e.g., meetings). Note that the actual benefits of clustering are highly dependent on site-specific conditions and that clustering can have the effect of increasing analytical complexity. Therefore, site-specific conditions should be considered and weighed against the potential benefits of streamlining the process.

Table 3-5. Sample Efficiencies (as percentage of project cost)[a]

Type of Clustering	Efficiency Range (Percent)
Watershed	25—35
Additional related pollutant, same water	30—45
Additional unrelated pollutant, same water	10—30
Adjacent watersheds, similar pollutants/methods	10—20

[a]Typical clustering efficiencies are based on Tetra Tech's experience

The final project plan provides a summary of the project definition; data compilation and analysis, data gap assessment; specific tasks to be undertaken during the project; technical and monetary resources needed; staff or contract personnel who will complete the project; potential constraints; budget; and expected timeline, interim milestones, and completion date. A sample Track C Project Plan outline is shown in Figure 3-3 and a sample template is provided in Appendix D.

Sample Project Plan Outline—Track C

I. **Introduction**
II. **Summary of Requirements**
    a. Project Definition
    b. Objectives
III. **Preliminary Data Review/Background**
    a. Geographic Setting
    b. Sources
    c. Monitoring
IV. **Project Tasks**
    a. Public Participation
    b. Data Gap Evaluation
    c. Data Collection
    d. Data Analysis
    e. Model Selection
    f. Model Application and Testing
    g. Results
    h. Alternatives Analysis
    i. Technology Transfer
    j. Regulatory Options
    k. Implementation Plan
    l. Final Report
    m. Administrative Record
V. **Personnel and Level of Effort**
    a. Project Organization
    b. Staff Assignment
    c. Level of Effort
VI. **Schedule and Products (by Task)**
    a. Timeline
    b. Milestones
VII. **Cost Estimate**
    a. Assumptions
    b. Allocations by Task

Tables

California 1998 303(d) Listed Waterbodies
Relevant Water Quality Objectives
Existing and Potential Beneficial Uses
Available Geographic or Location Information
Available Monitoring Data
NPDES Discharges
Land Ownership Percentages
Land Cover Distribution
Approach Advantages and Disadvantages

Figures

Watershed Location
Location and Topography
Digital Elevation Map
Land Ownership
Land Use Coverage
Project Schedule

Figure 3-3. Sample Project Plan Outline

4. DATA COLLECTION AND MONITORING

Data gaps identified during the data analysis might be significant enough to delay the technical analysis phase until additional data are collected. Additional monitoring might be needed to

- Confirm impairment
- Evaluate criteria
- Support the project analyses
- Calibrate and validate models
- Identify or eliminate possible sources
- Test or evaluate management options

When additional data are needed, a monitoring plan should be developed that outlines the objectives of the monitoring effort, the methods of collecting and storing the data (including all quality assurance [QA] procedures), and how the data will be used in the analysis. The monitoring plan (see Figure 4-1) should include

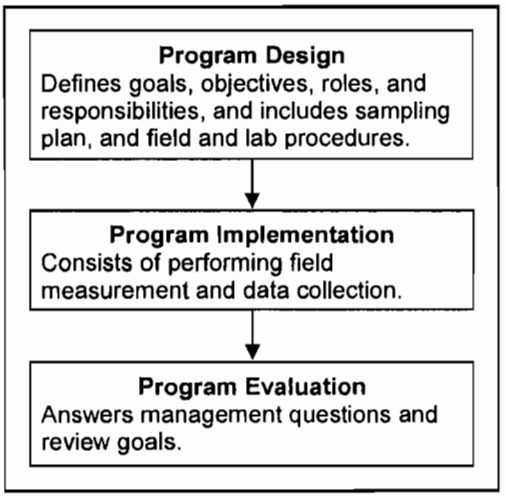


Figure 4-1. Key Phases in Development of a Monitoring Program

1. A **program design** component that identifies key management questions to be answered by the monitoring program; defines the data quality requirements; details the technical aspects of field sampling; defines standard operating procedures, methods for laboratory analysis and quality control, and chain of custody; and includes a data management plan.
2. A **program implementation** phase that consists of performing field measurements and data collection, laboratory analysis, and processing and storage of program data. Program implementation should be performed according to the standard operating procedures and quality assurance plan developed during the program design step.
3. A **program evaluation** phase in which the data collected from the monitoring program are assessed for accuracy and sufficiency and are used to support analyses that answer the management questions defined in the program design.
4. The monitoring plan should also be checked to ensure it is consistent with the guidance and requirements of the Water Boards' Surface Water Ambient Monitoring Program (SWAMP).

Each step of the monitoring process consists of a set of elements that provides a structured approach for ensuring that all monitoring considerations are addressed and coordinated in an effective manner. Monitoring builds on the existing framework of state monitoring (e.g., Surface Water Ambient Monitoring Program [SWAMP]—see box below), as well as related state, federal, local, and nonpoint and private efforts

Monitoring programs developed for collection of additional data for TMDLs must be consistent with current SWAMP procedures and guidelines. SWAMP has established guidelines for field sampling (including standard operating procedures), a performance-based system for laboratory analyses, a Quality

Surface Water Ambient Monitoring Program (SWAMP)

The SWRCB recently created the Surface Water Ambient Monitoring Program (SWAMP) as a first step toward developing a long-term ambient monitoring program. SWAMP serves as an umbrella program for Water Board monitoring activities, including the TMDL Program. SWAMP provides a framework for producing consistent and comparable high quality data that is easily accessible via the internet. (SWAMP is intended to meet four goals:

- Identify specific problems preventing the SWRCB, RWQCBs, and the public from realizing beneficial uses in targeted watersheds.
- Create an ambient monitoring program that addresses all HUs of the State using consistent and objective monitoring, sampling and analysis methods; consistent data quality assurance protocols; and centralized data management.
- Document ambient water quality conditions in potentially clean and polluted areas.
- Provide the data to evaluate the effectiveness of water quality regulatory programs in protecting beneficial uses of waters of the State.

Because SWAMP is a relatively new program, it is still being developed and refined. Each Regional Board has a SWAMP Coordinator that can provide the most current information on the program.

Management Plan that details quality assurance and quality control requirements and minimum data quality objectives. SWAMP also has an internet accessible database and requirements on database architecture, data standards, and water quality data elements. SWAMP guidelines and requirements are refined annually. The most up-to-date information can be found.

4.1. Monitoring Program Design

The design step will result in the development of an overall framework for designing and implementing an effective sampling plan with well-defined criteria and specifications along with associated laboratory analyses and data quality control procedures. Before the monitoring program is designed, an appropriate plan should be developed. Planning a successful monitoring program relies on (1) collecting and properly processing all programmatic and technical information relevant to characterizing the intended use of the data; (2) defining the relationships between the various planning components, including management questions to be answered, available resources, and site conditions; and (3) deriving a set of monitoring objectives and guidelines for final design of the program. Figure 4-2 illustrates the important planning elements to consider prior to design and implementation of data collection.

The design step of the monitoring program involves development of (1) data quality and monitoring objectives; (2) a sampling design plan, including detailed specifications for standard operating procedures, and a logistical and training program; (3) a data management plan; and (4) a Quality Assurance Project Plan (QAPP). The monitoring design provides complete documentation of the data collection procedures and the rationale or justification supporting the various planning and design conditions.

SWRCB's *Proposal for a Comprehensive Ambient Surface Water Quality Monitoring Program* includes information on

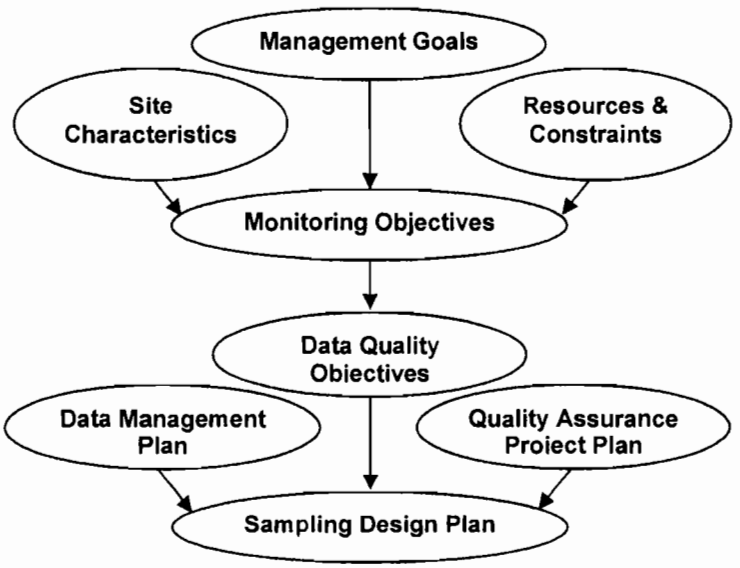
- Designing a monitoring study
- Identifying water quality indicators
- Performing necessary quality assurance
- Managing, evaluating, and reporting data

4.2. Monitoring Program Implementation

The implementation of the monitoring program requires that decisions made in the design step be translated into an operations field-monitoring program. Decisions must be made regarding

- Equipment installation and testing
- Finalization of field operating procedures

- Sample handling and processing
- Preliminary review of testing or initial monitoring results
- Sampling design plan and implementation review



Elements to Consider for Monitoring Objectives

- Monitoring approach selected
- Sampling locations identified
- Pollutants defined
- Stream flow
- Media (e.g., water column, sediment)
- Duration of sampling program
- Adequacy and sufficiency of data requirements
- Level of QA/QC required
- Roles and responsibilities of project staff defined

Elements to Consider for Sampling Design

- Data quality objectives
- Monitoring approach
- Data collection protocols
- Field operation procedures
- Laboratory analyses, detection limits, holding times, preservation, and chain of custody
- Data management system
- Data analysis techniques
- QA/QC

Figure 4-2. Components of Program Design

Public awareness and involvement are also important aspects of the monitoring program. Prior to commencement, community surveys and meetings concerning community expectations of aesthetic and recreational aspects of the design should be considered. A well-informed public would see the need for pollution control and would likely support the monitoring effort. The public will also want to see the results of the efforts in a timely manner. Carefully prepared press releases or articles are very effective in communicating ideas or results to the public. Additional information should be available to those who show a particular interest, and key project personnel should make time to be available for questions.

4.3. Monitoring Program Evaluation

The monitoring program culminates in the evaluation step. A good understanding of data limitations is essential for integrating the results into the technical analyses and selecting an appropriate data analysis methodology. Any conclusions or inferences should include a statement on the associated degree of confidence. Important considerations in assessing the degree of confidence associated with any conclusions are (1) how well do the data represent short- and long-term variability in the hydrologic regime, and (2) are the data sufficient to answer management questions to the desired degree of confidence.

Depending on the nature of the additional data collection and the results of the data analyses, the project plan may be revised or the project analysis may be initiated using the data provided by the supplemental monitoring program. For instance, the results of the additional data collection may indicate that the previous project plan is no longer appropriate. Ideally, the additional data would support an alternate

project plan. Conversely, the additional data can confirm that the existing project plan is appropriate and provide the necessary temporal and spatial resolution to complete the plan.

Example of Supplementary Monitoring

The Shenandoah River drains more than 3,000 mi^2 of predominantly forested land in northwestern Virginia and northeastern West Virginia. Several segments of the river were identified on Virginia's and West Virginia's 303(d) lists as impaired due to polychlorinated biphenyl (PCB) contamination and subsequent fish consumption advisories. Because the impaired river crosses the Virginia-West Virginia border and applicable water quality criteria vary dramatically between the states, USEPA Region 3, Virginia Department of Environmental Quality, and West Virginia Department of Environmental Protection worked together to develop TMDLs using a consistent methodology that evaluated all relevant water quality standards.

Existing PCB data for the Shenandoah River were spatially limited in that they primarily reflected conditions at or near a historical contamination site; the were limited in the sense that most data failed to detect PCBs in either sediment or surface water at levels necessary to compare to standards because of the analysis technique used. Therefore, to better understand the variability in PCB concentrations in the Shenandoah River, and to either discount or identify other potential sources, a focused sampling effort was undertaken. This effort included collection of water column, sediment, and tissue samples at locations upstream, downstream, and within the impaired river segments to better ascertain the spatial distribution of PCBs in the aquatic environment. Eleven sites were selected based on spatial variability and the locations of existing sites. Given the need for a lower detection level and consistency with the state water quality standards, a USEPA-approved method with an acceptable detection limit was used for analyzing individual PCB congeners. Ultimately, the monitoring data were used to define boundary conditions for a site-specific simplified mass balance model that considered potential sources, critical in-stream processes and interactions, and the suite of potential water quality targets or endpoints.

Selected National Data Collection and Monitoring References

- *Rapid Bioassessment Protocols for Use in Streams and Wadeable Rivers: Periphyton, Benthic Macroinvertebrates and Fish, Second Edition.* EPA 841-B-99-002. U.S. Environmental Protection Agency, Office of Water, Washington, DC. http://www.epa.gov/owow/monitoring/rbp/
- *National Handbook of Water Quality Monitoring. Part 600, National Water Quality Handbook.* U.S. Department of Agriculture, Natural Resources Conservation Service, Washington, DC.
- *Monitoring Guidance for Determining Effectiveness of Nonpoint Source Controls, Final.* EPA 841-B-96-004. U.S. Environmental Protection Agency, Office of Water, Washington, DC.
- *Techniques for Tracking, Evaluating, and Reporting the Implementation of Nonpoint Source Control Measures—Agriculture.* EPA 841-B-97-010. U.S. Environmental Protection Agency, Office of Water, Washington, DC. http://www.epa.gov/owow/nps/agfinal.html
- *Techniques for Tracking, Evaluating, and Reporting the Implementation of Nonpoint Source Control Measures —Forestry.* EPA 841-B-97-009. U.S. Environmental Protection Agency, Office of Water, Washington, DC. http://www.epa.gov/owow/nps/forestry/index.html
- *Volunteer Stream Monitoring: A Methods Manual.* EPA 841-B-97-003. U.S. Environmental Protection Agency, Office of Water, Washington, DC. http://www.epa.gov/owow/monitoring/volunteer/stream/
- *Techniques for Tracking, Evaluating, and Reporting the Implementation of Nonpoint Source Control Measures — Urban.* EPA 841-B-00-007. U.S. Environmental Protection Agency, Office of Water, Washington, DC. http://www.epa.gov/owow/nps/urban2.html
- *National Water Quality Monitoring Council web site contains information on national approach to data quality and comparability* http://water.usgs.gov/wicp/acwi/monitoring/index.html

Selected California Data Collection and Monitoring References

- Surface Water Ambient Monitoring Program web site contains latest updates on Water Boards' monitoring guidance and requirements http://www.waterboards.ca.gov/swamp/index.html
- *Proposal for a Comprehensive Ambient Surface Water Quality Monitoring Program.* http://www.waterboards.ca.gov/legislative/2000.html

5. PROJECT ANALYSES

Up to this point, this document has focused on the planning and design of impaired waters projects. The next phase consists of project analyses that will determine the pollution or pollutant management requirements and provide the rationale and justification for the implementation of an optimal set of regulatory and nonregulatory actions needed to improve or maintain water quality to support beneficial uses. This chapter will outline the decision process and general steps for conducting project analyses. The use of conceptual models is introduced as a technique for understanding and communicating relationships between pollutants and impairments and for providing a framework for designing and executing project analyses. Project analyses successfully used in California for common impairment types are summarized. It is beyond the scope of this document to provide an exhaustive description of all the methods available. Instead, examples and references to more detailed information have been provided for each of the steps. Categorical technical modules that provide step-by-step guidance are under development as a companion to this document; modules for bacteria and urban pesticides are currently under way. <Insert Web page containing draft modules, when available.> The general steps outlined in this chapter include

Conceptual Model

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

Data Analyses: The compilation and analysis of data and information are essential to understanding the general water quality conditions and trends and potential pollutant sources. Data analyses, which are targeted or focused depending on the pollution and waterbody characteristics, can guide the approach for addressing the impaired water or completing the appropriate regulatory action (e.g., TMDL development).

Technical Analyses: In this step the conceptual model or understanding of the impaired waters is developed and specific technical analyses are selected and executed to evaluate impaired waters. This step typically provides the technical underpinnings of all future decisions and drives the regulatory and nonregulatory actions. The technical analyses can include applying models or other analytical tools to support an understanding of how pollutant loading affects instream conditions. The technical analysis of watershed loading and waterbody response (linkage analysis) results in the calculation of the allowable loading to meet water quality standards (e.g., the loading capacity for TMDLs) and supports the evaluation of multiple management and pollutant reduction scenarios to achieve water quality standards.

TMDL Allocation: Allocation analysis follows a stepwise process to identify the assimilative capacity of the receiving water and how the allowable loading capacity can be allocated among the various sources. The allocation analysis should result in the determination of the loading capacity (or TMDL), load allocation, waste load allocation, and margin of safety, and it should clearly identify background conditions considered. The analysis should also consider the seasonal variation of both the loading characteristics and hydrologic variability of the stream flow and its assimilative capacity.

The allocation phase might also consider permit requirements, watershed-based permitting, or pollutant trading opportunities.

Project Report: The project report documents the analyses performed, information sources, and results and conclusions. The project report for TMDLs provides documentation of the required elements of the TMDL. For actions requiring a Basin Plan amendment (e.g., TMDL), the report should also address the requirements for an administrative record documenting the process and technical backup for the analyses performed.

5.1. Selection of Project Analyses

A wide variety of waters are listed as impaired on California's 2002 Section 303(d) list. More than 160 different pollutants were identified as contributing to impairment of waterbodies across the state. However, 25 pollutants were found in more than 60 percent of the listed waters. Table 5-1 shows the most frequently identified pollutants and their associated cumulative percentage of the total listed waters. Note that some of the listed pollutants are associated with related impairments (e.g., high coliform, beach closures, and pathogens) and could be grouped into larger general categories.

Table 5-1. Top 25 Listed Pollutants (CA 2002 303(d) list)

Pollutant	Frequency	Percent	Cumulative Percent
Sedimentation/Siltation	129	7%	7%
Diazinon	85	5%	11%
High Coliform Count	77	4%	15%
Mercury	66	4%	19%
Pathogens	66	4%	22%
Fecal Coliform	60	3%	26%
DDT	54	3%	29%
Nutrients	54	3%	31%
PCBs	51	3%	34%
Bacteria Indicators	45	2%	36%
Beach Closures	42	2%	39%
Temperature	37	2%	41%
Ammonia	36	2%	43%
Copper	36	2%	45%
Algae	30	2%	46%
Lead	30	2%	48%
Organic Enrichment/ Low Dissolved Oxygen	29	2%	49%
Trash	28	1%	51%
Phosphorus	27	1%	52%
Total Dissolved Solids	27	1%	54%
Metals	26	1%	55%
Unknown Toxicity	26	1%	56%
Pesticides	24	1%	58%
Selenium	24	1%	59%
Sediment Toxicity	23	1%	60%

Understanding the types of impairments that occur in California can help identify the types of analyses that may be employed in investigating impairments, developing conceptual models, diagnosing causes of impairment, and identifying management solutions. An examination of the waterbody types (e.g., river, lake, reservoir, estuary, coastal) in combination with types of impairments has been used to identify 10 major categories of frequently observed combinations (Figure 5-1).

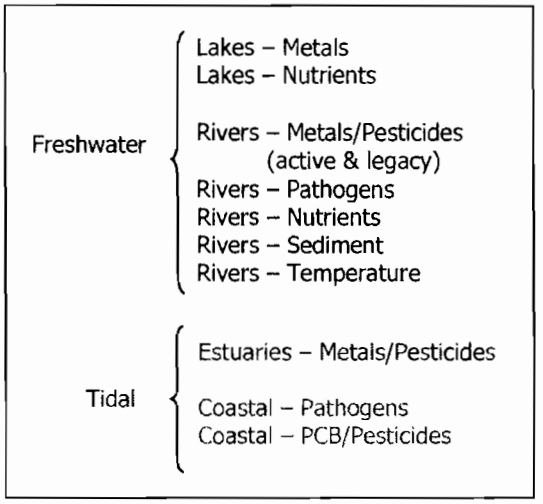


Figure 5-1. Ten Major Waterbody/Pollutant Combinations in California

When evaluating the characteristics of a specific waterbody and associated impairment(s), a conceptual model that demonstrates an understanding of the system

should be developed. The use of conceptual models is derived from ecological risk assessment approaches, which bear many similarities in objectives and procedures to impaired waters analyses (USEPA, 1998). Conceptual models can be as simple as a statement (e.g., stormwater runoff is causing exceedances of the acute zinc WQO). For complex systems a conceptual model may identify chemical and biological relationships that describe multiple influences and interactions associated with the impairment, such as the conceptual model of the San Francisco Bay copper impairment shown in Figure 5-2.

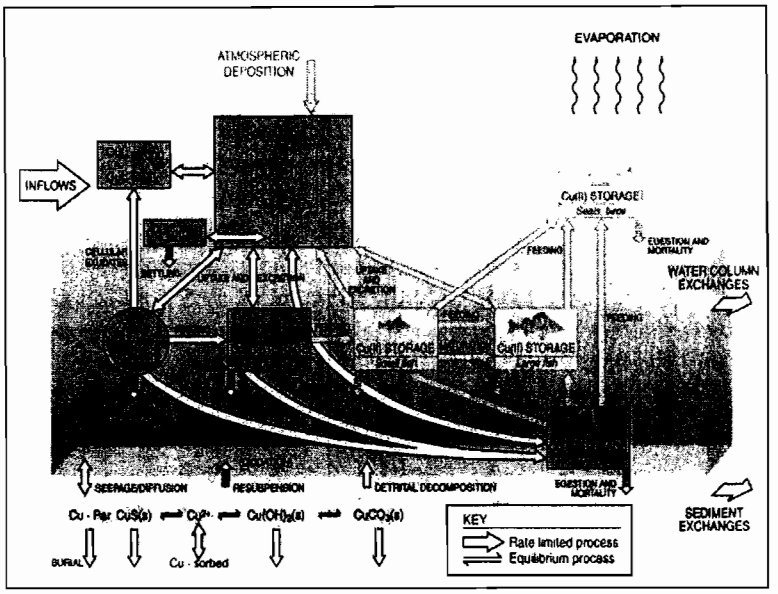


Figure 5-2. Conceptual Model Schematic for San Francisco Bay Copper Study

A conceptual model is based on an understanding of the impairment and the associated dynamics between the use to be supported, the pollutants identified, the processes of source loading, and instream processes. The conceptual model builds on an understanding of **what** the impairment is, **when** the impairment occurs, and **how** the associated loading occurs or stressor affects the use (Figure 5-3).

- **When** and under what environmental conditions does the impairment occur? (e.g., during a runoff event, during a dry, hot weather period). Understanding when the problem occurs leads to a determination of the critical environmental conditions defined by factors such as flow, temperature, or sunlight.
- **How** did the pollutant or related loading occur (e.g., legacy loading of toxics or pesticides, current loading of metals from stormwater)? Understanding how the loading of the pollutant occurred also defines the types of sources that may ultimately contribute to the impairment (e.g., stormwater runoff, point source discharges).

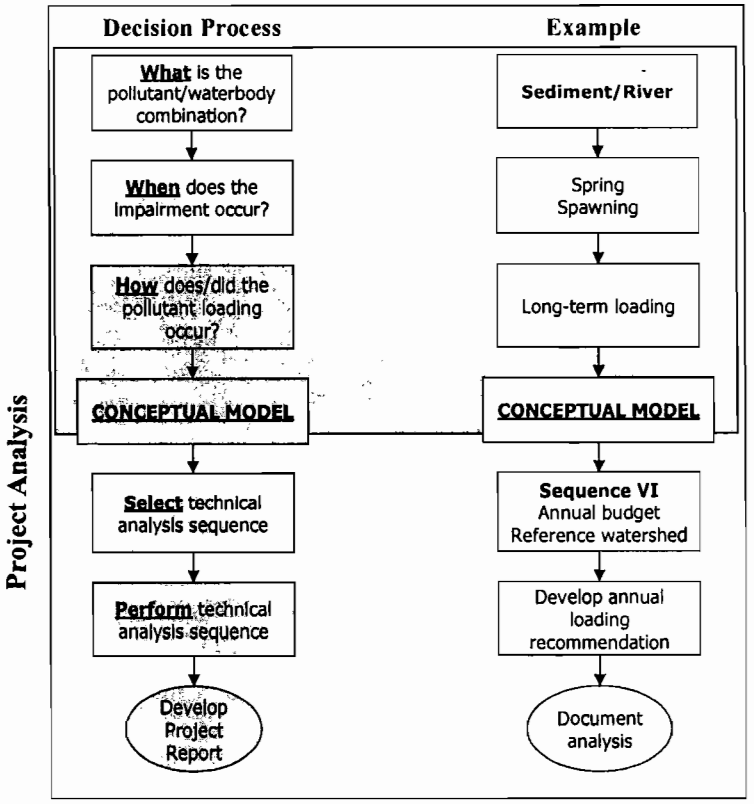


Figure 5-3. Project Analyses Decision Process

Typical sequences of technical analyses for 11 types (10 major combinations, and 1 combination having two types of pesticides—active and legacy) are shown in Table 5-2. The typical sequences are compilations of techniques successfully used in California and other states to perform impaired waters analyses. Practitioners may also derive their own technical analyses with the understanding that they must address key features of the impairment and the required elements of the UAA (Track B) or TMDL or pollution-related impairment (Track C). The following sections describe in more detail some of the analysis techniques used. Brief descriptions of the public domain models mentioned in Table 5-2 can be found on page 5-17. Categorical technical modules with detailed descriptions of technical approaches and case studies are also under development as a companion to this document. (Appendix E contains case studies highlighting various approaches for addressing impaired waters. Additional case studies will be added as relevant TMDLs are approved by the SWRCB.)

Table 5-2. Summary of Analysis Sequences for Selected Impaired Water Categories

What is the Impaired Water Category?		**I**	**II**	**III**
		River – Pathogens	**Lake – Nutrients**	**River – Nutrients**
When does the impairment occur?		Storm events or warm weather, dry season periods	Summer/dry season	Summer/dry season/year-round
How is the loading delivered?		Storm event runoff or dry weather discharge, direct deposition	Stormwater runoff, dry weather inflows, point sources	Dry weather inflows (point source discharges, nonpoint sources, groundwater)
Data analyses		o Exceedance analysis (geometric mean, not to exceed) o Flow frequency o Wet/dry day separation o Characterization of "hot spots"	o Lake trophic state evaluation o Nutrient/chlorophyll *a* o Summer statistics o Watershed loading estimates	o Stream dry and wet season statistics o Spatial analysis o Downstream of tributaries, phosphate sources o Undisturbed or reference areas for background o Benthic chlorophyll *a* or algal coverage
Technical Analyses:	General Approach	Wet weather and dry weather pathogen analysis	Eutrophication analysis to identify nutrient loading thresholds to meet in-lake targets	Low- or high-flow analysis of nutrient loading thresholds to meet instream targets
	Watershed Loading	Flow, concentration, and load estimation using HSPF	Load estimation using GWLF. More detailed option HSPF	Load estimation based on tributary and point source low-flow monitoring
	Receiving Water Response	Instream response using HSPF (data collection consideration)	Lake response using BATHTUB. More detailed option using CEQUAL-W2 or EFDC.	Stream response using mass balance, QUAL2E low-flow model, or WASP
Calculation of Loading Capacity		Number of exceedance days based on model output or monitoring data and comparison with reference watershed	Loading of nitrogen and phosphorus needed to meet lake target as simulated by lake model	Loading or concentration for critical low-flow or average summer, or high-flow periods
Typical Implementation Practices		Targeted management of pathogen sources: stormwater, rural uses, septics	Targeted management of nutrient sources: stormwater, rural uses, open space uses, septics, point sources	Targeted dry or weather reductions from point sources, dry season nonpoint sources
Case Studies		Santa Monica, CA http://www.waterboards.ca.gov/rwqcb4/html/meetings/tmdl/tmdl_ws_santa_monica.html	Lake Elsinore and Canyon Lake, CA http://www.waterboards.ca.gov/rwqcb8/html/tmdls.html	Los Angeles River Nutrients TMDL, CA http://www.waterboards.ca.gov/rwqcb4/html/meetings/tmdl/tmdl_ws_los_angeles.html

Table 5-2. Summary of Analysis Sequences for Selected Impaired Water Categories (continued)

What Impaired Water Category?		IV **River – Pesticides/Urban (Active Pesticide Sources)**	V **River – Pesticides/Legacy (No Current Pesticide Sources)**	VI **River/Estuary – Toxics**
When does the impairment occur?		Mixed. Associated with application dates and days when transport occurs	Mixed. Associated with disturbance or resuspension of historical deposits	Mixed
How is the loading delivered?		Urban runoff, typically storm drains. Dry weather discharges including irrigation and dumping	Historic delivery. Resuspension due to storm events, aquatic life	Municipal and industrial wastewater, urban runoff, agricultural runoff, other sources
Data analyses		o Standards evaluation o Trends evaluation o Spatial analysis	o Standards evaluation o Trends evaluation o Spatial analysis o Fish/mussel data analysis	o Standards evaluation o Trends evaluation o Spatial analysis
Technical Analyses:	General Approach	Identification of reduction needed to meet water column toxicity-based targets	Identification of reduction needed to meet sediment, fish tissue, or water column water quality toxicity-based targets	Identification of reduction needed to meet sediment, fish tissues or water column toxicity-based targets
	Watershed Loading	Source characterization	Tributary monitoring	Source characterization
	Receiving Water Response	Allowable loading determination based on calculation from identified target at design flow or a range of flows	Allowable loading determination based on calculation from identified target at design flow or a range of flows	Allowable loading determination based on calculation from identified target at design flow or a range of flows
Calculation of Loading Capacity		Allowable load for design flow or annual period	Allowable load for design flow or annual period	Allowable load for design flow or annual period
Typical Implementation Practices		Reduction or elimination of active pesticide sources	Removal or stabilization of deposits, long-term attenuation	Reduction or elimination of active toxic sources
Case Studies		San Francisco Bay Area Urban Creeks Pesticide Toxicity/Diazinon TMDL, CA http://www.waterboards.ca.gov/rwqcb2/urbancrksdiazinontmdl.htm	Newport Bay, CA http://www.epa.gov/region09/water/tmdl/final.html	Newport Bay, CA http://www.epa.gov/region09/water/tmdl/final.html

Table 5-2. Summary of Analysis Sequences for Selected Impaired Water Categories (continued)

		VII	VIII	IX
What is the Impaired Water Category?		**River – Sediment**	**River – Temperature**	**River – Biological**
When does the impairment occur?		Nonseasonal: estuary infilling, pool filling Spring: spawning/incubation All seasons: rearing Winter: migration (turbidity-related)	Summer/dry-warm weather	Multiple/dry-wet season
How is the loading delivered?		Storms and throughout the wet season over a wide range of flows	Summer heat input	Depends on pollutants/stressors associated with the impaired conditions
Data analyses		o Total suspended solids (TSS) analysis o Spatial analysis o Historical trends o Physical/geomorphic instream conditions (channel physical parameters) o Hillslope conditions (road density, conditions, unstable areas) o Turbidity o Fish or other biological populations/distribution o Identification of reference watersheds o Identification of reference time periods (alternative to reference watershed if not available)	o Seasonal temperature analysis o Spatial temperature analysis o Exceedance analysis o Analysis of vegetation and stream corridor	o Biological criteria evaluation o Correlation analysis (biological to chemical/physical indicators) to determine dominant pollutants/stressors o Spatial analysis to identify potential sources/stressors o Identification of reference watersheds
Technical Analyses:	General Approach	Long-term loading analysis based on sediment budget and reference approach. Sediment source analysis if full budget not possible Turbidity/TSS events Sedigraphs (combination of flow and turbidity/TSS data)	Temperature estimation based on flow, solar inputs, stream geometry, meteorologic conditions, vegetative shading, and other factors	Biological reference approach, load estimation for identified pollutants
	Watershed Loading	Load estimation using sediment budget or sediment source analysis Estimation of inputs based on sediment yields and delivery from land use/erosion categories	Temperature estimation based on models of flow, travel time, solar/meteorologic conditions. Shade models do not address watersheds with dams or high levels of irrigation return flows, or cooling water discharges.	Load estimation of identified pollutant(s) contributing to biological impairment using GWLF or similar model
	Receiving Water Response	Load target determined from comparison with desired reference watershed Rate of infilling Geomorphic/habitat targets derived from literature	SSTEMP or SNTEMP stream flow and temperature analysis, QUAL2E stream flow and temperature analysis	Comparison of estimated watershed/source loads with loads in reference watershed
Calculation of Loading Capacity		Average annual sediment load from dominant sources to meet reference conditions. Identification of achievable reductions by source category	Heat loading Shade dominated streams Effective shade allocations (% of stream shade	Annual loading benchmarked to reference watershed
Typical Implementation Practices		Targeted management of sediment sources for long-term restoration	Targeted management of vegetation and stream system, dam releases, irrigation withdrawals, or return flows	Targeted management of relevant pollutant sources
Case Studies		Garcia River, CA http://www.epa.gov/region09/water/tmdl/final.html	North Fork Eel River, CA http://www.epa.gov/region09/water/tmdl/final.html	Cooks Creek, VA http://www.deq.state.va.us/tmdl/tmdlrpts.html

Table 5-2. Summary of Analysis Sequences for Selected Impaired Water Categories (continued)

		X	XI
What is the Impaired Water Category?		**Estuary – Nutrients**	**Coastal – Pathogen**
When does the impairment occur?		Die-off of macrophytes, floating maps, algal blooms	Spring runoff or winter and summer dry weather
How is the loading delivered?		Annual/long-term nutrient loading from runoff, nutrients associated with sediment, groundwater	Runoff/wet weather sources or dry weather sources Direct deposition
Data analyses		o Load estimation o Long-term trends evaluation o Spatial analysis o Seasonal trends o Algal densities	o Standards evaluation o Seasonal evaluation o Wet and dry day analysis o Spatial analysis
Technical Analyses:	General Approach	Long-term loading, nutrient cycling, and response of estuaries	Wet weather loading and response of estuaries
	Watershed Loading	Load estimation using GWLF, HSPF, analyses of monitoring data, or similar model	Load estimation using HSPF or direct analysis of monitoring data
	Receiving Water Response	Estuary response using Tidal Prism, WASP, EFDC, or similar model	Response using WASP, EFDC, or similar model Alternatively determine correlation of coastal impairment with tributary loading
Calculation of Loading Capacity		Annual loading based on meeting estuary target condition	Wet and dry weather exceedance frequencies and associated loading
Typical Implementation Practices		Targeted management of nutrient and sediment sources: stormwater, rural uses, open space uses, septics, point sources, irrigation return flows, fertilizer management	Targeted management of pathogen sources: stormwater, rural uses, septics
Case Studies		(Several available nationally)	Santa Monica, CA http://www.waterboards.ca.gov/rwqcb4/html/meetings/tmdl/tmdl_ws_santa_monica.html

5.2. Data Analyses

Typical Data Analyses Objectives

To compile and review data by

- Developing a data inventory
- Evaluating data quality
- Identifying data gaps

To analyze data for evaluation of

- Impairment status
- Spatial trends
- Temporal trends
- Other relationships and trends (e.g., flow vs. pollutant, pollutant vs. pollutant)

The compilation and analysis of data and information is an essential step in understanding the general water quality conditions and trends, and potential pollutant sources. The data compilation and analysis will guide the approach used for addressing the impaired water or completing the appropriate regulatory action (e.g., TMDL development). Specifically, the compilation and subsequent review and analysis of data will support the following activities:

- Identification of data gaps and sampling needs
- Confirmation of impairment status
- Identification of potential sources (identify or confirm sources)
- Identification of critical conditions
- Evaluation of seasonal variation
- Selection of model/analysis options (discussed in the Technical Analyses section)
- Model setup and testing (discussed in the Technical Analyses section)

Data compilation and analyses are an ongoing process in the impaired waters analysis, with the focus, level of effort, and purpose varying from phase to phase. Table 5-3 presents the different levels and types of data review and analyses that might be conducted throughout the project. Most of the data analyses discussed in this section will build on activities performed during the Project Planning phase to evaluate the water's impairment and identify any relevant trends that would help to determine the staff and level of effort for completion of the project (e.g., WQS review, TMDL development).

Table 5-3. Levels of Data Review for the Impaired Waters Analysis

Data Compilation, Review, and Analysis Level	Project Phase	Description of Data Characterization	Examples of Data Review or Analysis Activity
I	Project Definition	Cursory review of data to understand the impairment and to evaluate data availability	▪ Identify the amount and type of data available for the impaired water (e.g., identify data available internally and in readily accessible national/state databases). ▪ Gain a better understanding of the data necessary to further evaluate the impaired water.
II	Project Planning	Targeted analyses of available data to characterize the impaired water for project planning purposes	▪ Conduct selected statistical analyses on water quality and flow data to confirm impairment, evaluate under what conditions impairment occurs, and identify spatial and temporal trends. ▪ Evaluate instream and watershed data (e.g., GIS, land use, permit information) to identify sources.
III	Project Analysis	Additional review and analyses of data for use in technical approach	▪ Review data types available to support model/approach selection. ▪ Analyze data to set up models (e.g., to identify appropriate model parameter values). ▪ Use data to directly complete technical analysis (e.g., use observed data to establish a spreadsheet mass balance calculation). ▪ Use data to support model calibration and validation. ▪ Determine method for filling data gaps.

Data Availability, Sources, and Quality

The first step in the data analysis is to compile and summarize all data that can be used to support the impaired waters analyses. In locating and compiling the data, it is also important to identify and consider the data sources and quality.

Data Availability and Inventory. The availability of data and the nature of the impairment will determine the types of data analyses and technical approaches that can be conducted. All relevant data should be compiled and a data inventory developed. The data inventory should provide a comprehensive summary of, and reference for, all relevant monitoring data. Table 5-4 provides examples of data and data sources that should be considered when preparing the data inventory.

The data inventory should list the data available, including monitoring period of record, location of data collection, number of samples or frequency of sampling, source of the data, and quality assurance/quality control (QA/QC) information associated with the data. If potentially relevant data is not recommended for use, the inventory should justify why the data is excluded (e.g., quality control, lack of documentation).

Information to be summarized in the data inventory:

- Type of data (e.g., monitored, geographic)
- Source of data (agency)
- Quality of data (QA/QC documentation, QAPP)
- Amount of data (number of samples)
- Spatial coverage (location of data collection)
- Temporal coverage (period of record)
- Data gaps
- Location of electronic and physical files

Table 5-4. Examples of Data Types and Sources to Consider for the Data Inventory[a]

Type of Data	Example Source
Monitored:	
Current/historical chemical, biological, and physical monitoring data	Check with RWQCB. USEPA's Storage and Retrieval (STORET) database (http://www.epa.gov/STORET/) USGS National Water Information System (NWIS) (http://waterdata.usgs.gov/nwis) USGS National Stream Water-Quality Monitoring Networks data (http://water.usgs.gov/pubs/dds/wqn96/) SWRCB Surface Water Ambient Monitoring Program (SWAMP) Data (check with regional contacts for database replica http://www.waterboards.ca.gov/swamp/contacts.html; validated SWAMP data available online through California Environmental Data Exchange Network (CEDEN) (http://baydelta.ca.gov/Php/ceden.php4?screen_width=1280&browser=IE)
Previous watershed or water quality analyses	Studies conducted by universities or by federal, state, or local agencies e.g. Natural Resource Project Inventory (http://www.ice.ucdavis.edu/nrpi/) California Environmental Resources Evaluation System (http://www.ceres.org/)
Flow and runoff information	USGS flow gage data (http://waterdata.usgs.gov/nwis)
Meteorological data	Climate data (e.g., precipitation, temperature, wind speed) available from the Western Regional Climate Center (http://www.wrcc.dri.edu/)
Point source monitoring data	Check with RWQCB. Discharge monitoring reports from permitted facilities (Facility and permit information available through USEPA's Permit Compliance System (PCS) [http://www.epa.gov/enviro/html/pcs/index.html])
Geographic (likely as geographic information system [GIS] data):	

Type of Data	Example Source
Maps of the watershed, point and nonpoint sources	Check with RWQCB, State Board (e.g. GIS viewer http://gisviewer.swrcb.ca.gov , GeoWBS), local agencies.
Waterbody size and shape information	California Spatial Information Library (CaSIL) (http://gis.ca.gov) USEPA's Reach File, Versions 1 and 3 (available in USEPA's Better Assessment Science Integrating Point and Nonpoint Sources [BASINS] modeling system [http://www.epa.gov/ost/basins/]) USGS National Hydrography Dataset (http://nhd.usgs.gov/data.html)
Tributary locations and characteristics	CaSIL (http://gis.ca.gov) USEPA's Reach File, Versions 1 and 3 (available in USEPA's BASINS [http://www.epa.gov/ost/basins/]) USGS National Hydrography Dataset (http://nhd.usgs.gov/data.html)
Current, historical, and potential future land uses	SPOT 10-meter through CaSIL (http://gis.ca.gov) California Department of Forestry and Fire Protection data (http://frap.cdf.ca.gov/data/frapgisdata/select.asp) USGS GIRAS land cover (available in USEPA's BASINS [http://www.epa.gov/ost/basins/]) USGS Multi-Resolution Land Characteristics (MRLC) land use/cover — http://www.epa.gov/mrlc/nlcd.htm) USGS's LULC data (http://edc.usgs.gov/geodata/) California Resources Agency's California Digital Atlas http://legacy.ca.gov/new_atlas.epl
Soil surveys and geologic information	U.S. Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS) Soil Survey State Soil Geographic (STATSGO) coverage (available in USEPA's BASINS [http://www.epa.gov/ost/basins/])
Topographic information	USGS topographic maps CaSIL Digital Elevation Model (DEM) (http://gis.ca.gov) USGS DEM (http://edc.usgs.gov/geodata/) USEPA's BASINS DEM (http://www.epa.gov/ost/basins/)
Monitoring locations	Water quality monitoring locations available through USEPA's BASINS coverages (http://www.epa.gov/ost/basins/) SWRCB Surface Water Ambient Monitoring Program (SWAMP) station locations (check with regional contacts listed at http://www.waterboards.ca.gov/swamp/contacts.html; validated SWAMP data associated with station locations available online through California Environmental Data Exchange Network (CEDEN http://baydelta.ca.gov/Php/ceden.php4?screen_width=1280&browser=IE) SWRCB GisViewer (http://gisviewer.swrcb.ca.gov)
Point source locations	Check with the RWQCB. Facility locations available through USEPA's BASINS GIS coverages (http://www.epa.gov/ost/basins/) or through USEPA's PCS (http://www.epa.gov/enviro/html/pcs/index.html)
Regulatory:	
Applicable water quality standards	WQOs available in the applicable Basin Plan
Permits Waste Discharge Requirements (WDRs)	Permit information from USEPA's PCS (http://www.epa.gov/enviro/html/pcs/index.html) Check with RWQCB.
Qualitative:	
Hypothesis regarding the causes or sources of impairment from agency personnel or local contacts	Anecdotal information on the listing of the waterbody

Type of Data	Example Source
Anecdotal information on the waterbody conditions (e.g., citizen complaints)	Records of citizen complaints including water quality, agency assessments of water quality or habitat

[a]Many of the identified sources are nationally available data sets. The analyst should always check with the RWQCB and local agencies for availability of locally prepared data prior to using national data sets.

Data Quality. When compiling data and reviewing their applicability and usefulness for the impaired waters analyses, it is important to consider the quality of the data. In many cases, the data are compiled from a variety of sources, including external sources (e.g., federal, state, and local agencies; university studies). It is often difficult to identify the QA/QC procedures that were used in the collection of the external data. Therefore, it is beneficial to evaluate the data's quality and usability with some set of criteria or assessment factors. These criteria could be highly variable depending on the intended use of the data or the resulting product (i.e., general assessment vs. enforcement action). This section will outline several factors to consider in evaluating the data quality, but will not establish specific guidelines or criteria to use in deciding whether or not to use a specific data set in impaired waters analyses.

USEPA's *Assessment Factors for Evaluating the Quality of Information from External Sources* (USEPA, 2002) discusses several assessment factors and considerations used in evaluating the quality and relevance of information obtained from external sources in support of agency actions. The five categories of assessment factors identified are

- Soundness
- Applicability and utility
- Clarity and completeness
- Uncertainty and variability
- Evaluation and review

These assessment factors are broadly applicable to most types of information and are flexible. These assessment factors should be considered when evaluating the data quality for an impaired waters analysis.

Assessment Factors for Evaluating Data Quality

Soundness: The extent to which the procedures, measures, methods, or models employed to generate the information are reasonable for and consistent with the intended application and are scientifically/technically appropriate.
Applicability and utility: The extent to which the information is applicable and appropriate for the intended use (in the analysis).
Clarity and completeness: The degree of clarity and completeness with which the data, assumptions, methods, quality controls, and analyses employed to generate the information are documented.
Uncertainty and variability: The extent to which the variability and uncertainty in the information or in the procedures, measures, methods, or models are evaluated and characterized.
Evaluation and review: The extent of independent application, replication, evaluation, validation, and peer review of the information or of the procedures, measures, methods, or models employed to generate the information.

Source: USEPA (2002)

Data Gaps. The data inventory should also be used to identify any relevant gaps, especially those that may hinder the selection and completion of an appropriate analysis approach. The data inventory can be used to identify obvious, broader data gaps, such as a lack of water quality or flow data for the watershed. However, the identification of data gaps can be an iterative process with more specific data needs being identified during the data analysis and also during subsequent phases of the impaired waters analysis (e.g., during model setup for TMDL development or implementation). For example, a long period of record of water quality monitoring data would typically indicate sufficient water quality data for analysis of the impaired water. However, when data analysis begins, it may become apparent that the data are not sufficient for evaluation of seasonal trends or other relationships and patterns. Each analysis of the impaired water may identify more data needs. In that case, it is necessary to determine whether the data needs are crucial to the completion of the analysis and whether additional monitoring or data collection is warranted now or future data collection should be recommended as part of implementation. (Monitoring is discussed in Chapter 4.)

Analytical and Characterization Activities

This section provides a summary of data analysis techniques that can be used to characterize impairments, support development of conceptual models, and design subsequent technical analyses.

Listing Confirmation and Impairment Analysis. The purpose of the listing confirmation and impairment analysis is to reevaluate the water quality conditions leading to the listing of the impaired water and to confirm that the impairment is still supported by any data collected after the listing occurred. The expression of the applicable WQO(s) is a fundamental factor in how the data should be evaluated for the impairment analysis. The data must be analyzed in a way that allows comparison to WQOs and considers the appropriate parameter, statistical expression, and time scale.

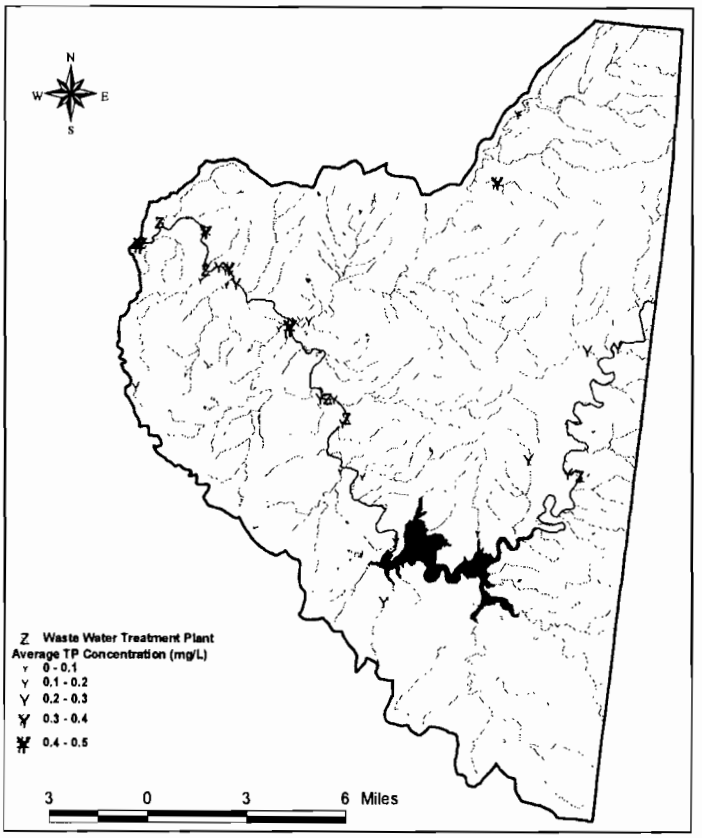


Figure 5-4. Sample Map Illustrating Spatial Variations in Water Quality Conditions

If the impairment analysis confirms that the waterbody is impaired, the impaired waters analyses will continue with the appropriate regulatory action (e.g., TMDL development, SSO). If the analysis of recent data or the reevaluation of historical data indicates that the waterbody is no longer impaired or was listed incorrectly, the impaired water should be delisted.

Spatial Trends. If instream water quality data are available at multiple sites throughout the watershed of the impaired water, an analysis of spatial variations or patterns in the data should be conducted. Evaluating spatial distribution of water quality conditions and the relative magnitude of WQO violations in the watershed can indicate the location of "hot spots" and sources potentially affecting impairment. Figure 5-4 presents an example of a graphic displaying the spatial variability of water quality conditions in a watershed.

Temporal Trends. Another important aspect to consider when evaluating impaired waters is the identification of temporal trends in water quality conditions. Evaluation of temporal patterns can assist in identifying potential sources in the watershed, seasonal variations, or declining/improving water quality trends.

Poor water quality during certain months or seasons can indicate the occurrence of a source that is active only during those times. For example, elevated concentrations of nutrients or bacteria during

Appropriate Analysis for Comparison to WQOs

Data analyses must allow for comparison to applicable WQOs. For example, fecal coliform objectives are often expressed as log means, using a minimum number of samples collected within a 30-day period. Therefore, the impairment analysis should calculate rolling log means of available samples within the specified time frame. Fecal coliform objectives typically also have an "instantaneous" standard allowing for a percent exceedance of samples (e.g., no more than 10 percent of samples in a 30-day period can exceed 400/100 milliliters). This objective allows for comparison of individual observations to a not-to-exceed value.

summer months may indicate increased source activity during those months, such as livestock grazing. The poor water quality may also indicate a need for further analysis of other watershed conditions (e.g., weather, flow) that can exacerbate the impairment during summer months. For example, warmer temperatures during summer months may increase the growth of algae leading to greater decreases in dissolved oxygen. Identification of seasonal variations in water quality conditions, and therefore violations of WQOs, is an important consideration for the completion of the appropriate regulatory action. TMDL development must include seasonal variation in the analyses, and site-specific objectives may take into account the appropriateness of seasonal objectives. Figure 5-5 presents an example of a graphic used to summarize the monthly variations in water quality conditions.

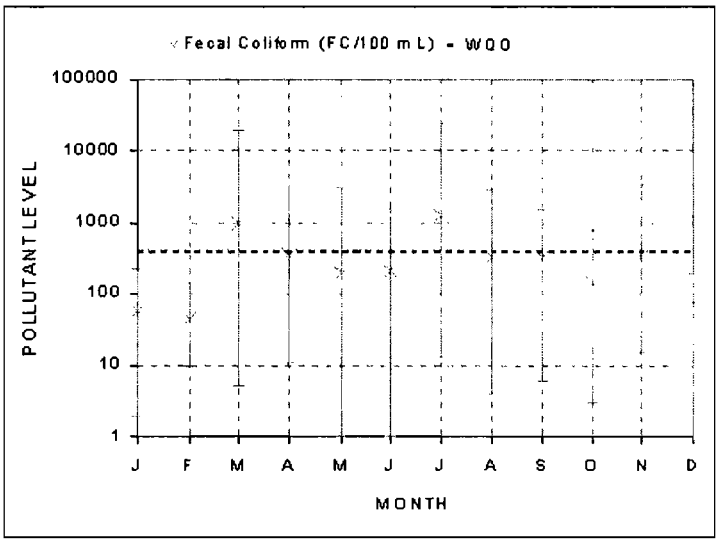


Figure 5-5. Sample Graphic of Monthly Variations in Instream Fecal Coliform Concentrations

Other Relationships and Trends. It is often beneficial to evaluate other relationships and trends in the available data in addition to spatial and temporal trends. Two important examples are

- Evaluating the relationship between flow and instream water quality
- Evaluating the relationship among related pollutants

An identifiable relationship between flow and instream water quality concentrations can indicate what types of sources dominate the instream impairment and can help identify critical conditions surrounding the impairment. For example, nonpoint sources that are precipitation-driven typically dominate instream water quality conditions during periods of high flow resulting from rainfall/runoff events, while point sources that provide relatively constant discharges to receiving waters dominate water quality during low flow when there is less water for dilution of effluent inputs.

It is also important to evaluate the correlation of instream concentrations (and loading) of pollutants of concern to other parameters that

- represent the same impairment

  For example, instream sediment or its effects can be represented by several parameters (e.g., TSS concentration, turbidty). Depending on what parameters are included in WQOs and what data are available, it might be beneficial to investigate any relationships among the different sediment parameters for use in future analyses for the impaired waters (e.g., TMDL development).

- are likely being contributed by similar sources or are acting as a source of the pollutant of concern.

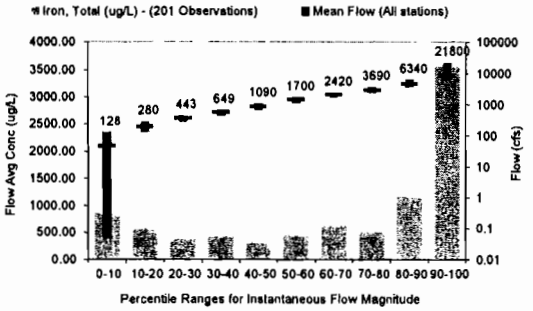
  For example, nutrients often attach to sediments, resulting in increased nutrient loading during times of high sediment erosion and runoff. Establishing a correlation between instream sediment and nutrient concentrations indicates that nutrient loading in the watershed is sediment-related. Understanding these relationships is important in the selection of approaches for the development and implementation of a TMDL or other regulatory action.

Critical Conditions. All of the analyses discussed in this section can support the identification of critical conditions, an important part of addressing impaired waters, especially in TMDL development. Critical conditions represent a description of when and under what conditions the impairment occurs. Specifically, the evaluation of temporal patterns in water quality data can provide substantial insight because the analysis identifies the times of greatest impairment and because many of the factors affecting critical conditions exhibit seasonal variations (e.g., flow and weather conditions, source activity). The results of the temporal analysis as well as the other data analyses can be evaluated to identify critical conditions for the impaired water, including flow conditions, season, weather conditions (e.g., temperature), or other applicable factors.

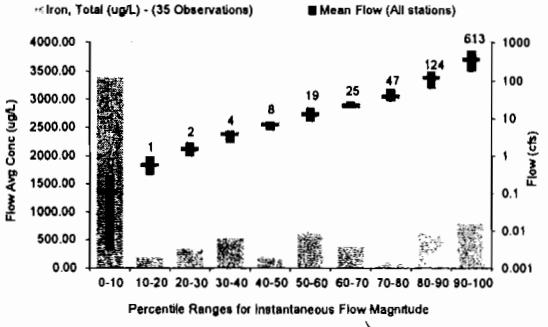
Examples of Data Analyses for Impaired Waters

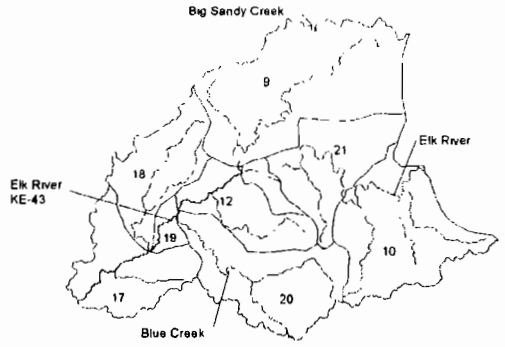
The Elk River watershed includes several stream segments impaired by metals, likely due to abandoned mines. Analysis of the available water quality and flow data was conducted to evaluate critical conditions, temporal variations in metals concentrations, and potential sources in the watershed. An evaluation of flow and metals concentrations at different points in the watershed indicated that metals impairments are occurring under very different conditions at different locations in the watershed, indicating the dominance of different sources. A station on the mainstem Elk River exhibited a correlation between metals concentrations and flow, with the highest metals concentrations occurring during higher flows. Meanwhile, analysis at an upstream tributary station indicated an inverse relationship between flow and metals concentration, with higher concentrations observed during low flows.

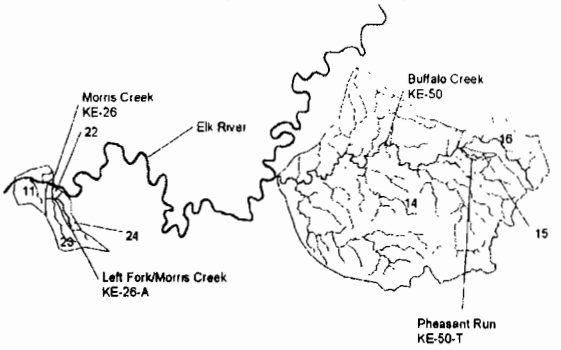
Mainstem Station—Flow and Iron



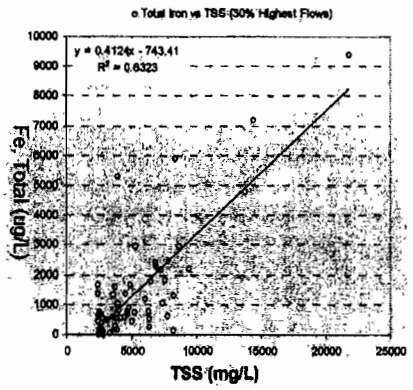
Tributary Station—Flow and Iron





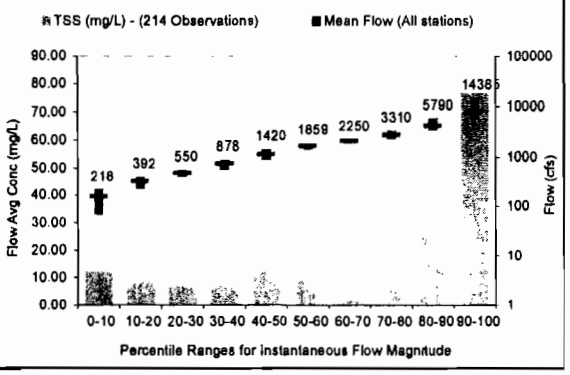


Mainstem Station—Flow vs. Sediment



Low flow is typically the critical condition for waters impacted by abandoned mine drainage. However, the water quality and flow relationship observed at the mainstem station indicated critical conditions during high flow—periods when abandoned mine drainage would be diluted and have a decreased effect on instream concentrations. Therefore, further analysis was conducted to evaluate potential sources affecting the mainstem. The relationships between sediment and metals and between sediment and flow were investigated, indicating a strong sediment-metals relationship and the occurrence of high instream sediment during the same flow conditions as those exhibiting high metals concentrations. The analysis suggested that the tributaries were impaired by abandoned mine drainage while the mainstem was also being affected by nonpoint source loading of metal-laden sediment.

Mainstem Station—Flow and Sediment



5.3. Technical Analyses

The technical analyses can include a variety of scientific, statistical, and modeling tasks designed to support the selection and testing of pollution management approaches. These analyses are ultimately used to understand the dose-response relationship, that is, to evaluate how changes in pollutant loading or stressors can result in meeting the water quality standards evaluated by objectives or target values. Table 5-2 presents sequences of data and technical analyses that are used successfully to evaluate typical waterbody/pollutant combinations from the California Section 303(d) list. Although there are no prescribed or required methods for impaired waters analysis in California, the practitioner must still identify methods that provide a technical rationale and supporting documentation for the recommended regulatory action. If new methods are proposed, a preliminary review of the methodology by the RWQCB, SWRCB, and USEPA is recommended. The selected analysis approach should use techniques with sufficient rigor to provide support for the selection of regulatory actions. This section discusses some of the typically used methods and defines key terminology used in describing the technical analyses employed.

One common misconception is that impaired waters analysis requires the use of a "computer model." A model is typically defined as a mathematical representation of a physical system. In the broadest interpretation, technical analyses are always a form of model—the analysis is our representation of the key features of the physical system. However, not all analyses need or require a computer modeling system or modeling package to perform the analysis. Selection of the appropriate technical analysis approach will determine when and if a computer modeling system is useful or necessary.

For some waterbody/impairment categories, approaches have evolved that can be used to determine the distribution and magnitude of loads that meet WQOs or provide simplified representation of the waterbody. The following are some of the techniques employed in impaired waters analyses:

Reference approach. This approach uses a reference watershed to identify numeric instream or loading targets for an impaired waterbody. The reference watershed is typically selected because it has been identified as an unimpaired waterbody with a watershed similar in land use, hydrology, and geology to the impaired waterbody's watershed.

Mass balance approach. This approach represents an aquatic system through an accounting of mass entering and exiting the system. Typically this analysis simplifies the representation of the waterbody and does not estimate or simulate detailed biological, chemical, or physical processes.

Flow duration/load duration approach. This method establishes allowable loads by plotting them as a function of flow. To establish a load duration curve, the applicable water quality concentration (e.g., water quality criterion) is multiplied by a range of flow values to calculate individual loads. The loads are then used to derive a curve of continuous flow-based loads. Conceptually, any point along the curve would identify the load necessary to meet water quality standards at the associated flow. This approach is used successfully in diagnosing and evaluating waters, but is typically not sufficient for determining allocation loads since the analysis does not explicitly describe where the loads are coming from or how they are delivered.

Some technical analyses will use modeling systems in various combinations to estimate loads, evaluate receiving water response, and consider various management scenarios. Selection of the appropriate model will depend on the key factors identified in Section 5.1 including waterbody/pollutant combination, when the impairment occurs, and how the loading is generated. An understanding of these factors can

guide the user to selection of models that provide appropriate information. General categories of models include

Watershed models. Watershed models simulate watershed loading based on inputs such as precipitation, land use, geology, soils, and other watershed features.

Receiving water models. Receiving water models evaluate waterbody conditions based on external inputs (tributary loads, groundwater inputs, tides), waterbody features (volume, depth, internal recycling), and environmental conditions (temperature, precipitation).

Some receiving water modeling analyses are oriented toward dry weather conditions. These models are typically referred to as "steady-state" because they are used to evaluate a condition that may persist for a longer period of time. Many of the waters where impairment occurs under dry weather conditions can be evaluated by using this class of receiving water models. Other impairments may require the use of a "dynamic" or time-varying model to evaluate a range of wet or dry sequences. Brief profiles of and references for some of the public domain models used most frequently for impaired waters analysis are provided in the sidebar and the insert below. USEPA's 1997 *Compendium of Tools for Watershed Assessment and TMDL Development* and other published guidances and books provide extensive lists of other available modeling tools and information sources.

Regardless of whether simplified techniques, spreadsheet models, or one or more modeling systems are employed, the technical analysis typically includes three key steps.

1. ***Model setup/configuration*** involves defining units of analysis such as subwatersheds or portions of streams, categories of sources, and time period of analysis.
2. ***Model testing*** evaluates how reasonable the results of the analysis are. Even for the simplest analysis, available information and related studies can be used to evaluate the results. For more sophisticated applications a series of comparisons of model predictions and monitoring data might be needed.
3. ***Model application*** includes the evaluation of existing conditions and consideration of alternatives or management scenarios.

Modeling References

Bicknell, B.R., J.C. Imhoff, J.L. Kittle, A.S. Donigian, R.C. Johanson. 1987. *Hydrological Simulation Program – FORTRAN (HSPF): User's Manual for Release 10.0.* EPA 600/3-84-006. U.S. Environmental Protection Agency, Environmental Research Laboratory, Athens, GA.

Bowie, G.L., et al. 1985. *Rates, Constants, and Kinetics Formulations in Surface Water Quality Modeling.* 2nd Edition. EPA/600/3-85/040. U.S. Environmental Protection Agency, Environmental Research Laboratory, Athens, GA.

Nix, J.S. 1991. Applying urban runoff models. *Water Environment and Technology.* June 1991.

Thomann, R.V., and J.A. Mueller. 1987. *Principles of Surface Water Quality Modeling and Control.* Harper & Row, New York.

USEPA. 1988. *Storm Water Management Model Version 4, User's Manual.* EPA 600/3-88/001a. U.S. Environmental Protection Agency, Environmental Research Laboratory, Athens, GA.

USEPA. 1995. *Technical Guidance Manual for Developing Total Maximum Daily Loads. Book II: Streams and Rivers. Part 1: Biological Oxygen Demand/Dissolved Oxygen and Nutrients/Eutrophication.* EPA 823-B-95-007. U.S. Environmental Protection Agency, Office of Water, Washington, DC.

USEPA. 1997. *Compendium of Tools for Watershed Assessment and TMDL Development.* EPA841-B-97-006. U.S. Environmental Protection Agency, Office of Water, Washington, DC.

Typical Public Domain Models Used in Impaired Waters Analysis

Watershed Models

Generalized Watershed Loading Functions (GWLF). Mid-range watershed loading model developed to assess nonpoint source flow and sediment and nutrient loading from urban and rural watersheds.

Storm Water Management Model (SWMM). Detailed watershed model developed to evaluate urban stormwater flow and water quality through continuous or storm-event simulation for complex watersheds and land uses.

Hydrologic Simulation Program – FORTRAN (HSPF). Detailed, dynamic watershed and receiving water quality model developed for simulating water quantity and quality for a wide range of organic and inorganic pollutants from complex watersheds and land uses.

Loading Simulation Program – C++ (LSPC). GIS-based watershed assessment, analysis, and TMDL development system containing a watershed and receiving water quality model that uses HSPF algorithms.

Receiving Water Models

BATHTUB. Steady-state water quality model that simulates eutrophication-related water quality conditions in lakes and reservoirs.

Hydrologic Simulation Program – FORTRAN (HSPF). Detailed, dynamic watershed and receiving water quality model developed for simulating water quantity and quality for a wide range of organic and inorganic pollutants from complex watersheds and land uses.

Loading Simulation Program – C++ (LSPC). GIS-based watershed assessment, analysis, and TMDL development system containing a watershed and receiving water quality model that uses HSPF algorithms.

Enhanced Stream Water Quality Model (QUAL2E). Steady-state surface water quality model that simulates conventional water quality constituents in stream networks.

Water Quality Analysis and Simulation Program (WASP). Dynamic surface water quality model that simulates eutrophication kinetics, conventional water quality parameters, and toxics in one, two, or three dimensions.

Environmental Fluid Dynamics Code (EFDC). Hydrodynamic and water quality model that can be used to simulate surface aquatic systems in one, two, and three dimensions. EFDC simulates salinity, temperature, sediment, and conventional water quality parameters and includes a sediment diagenesis model.

SHADE. Modeling package that combines a GIS-based solar radiation prediction model with QUAL2E for instream steady-state temperature modeling.

For further information on models, general types of models, and their specific capabilities, refer to USEPA's *Compendium of Tools for Watershed Assessment and TMDL Development* (USEPA, 1997a).

5.4. Management/Allocation Approaches

One of the most complex decisions in the analysis of impaired waters is the development of a pollutant loading allocation plan. The plan requires the consideration of numerous factors, including cost, technical achievability, and equity. An allocation plan that achieves an acceptable balance between these factors has a greater chance of being accepted by the public and stakeholders.

The first step in the evaluation is to determine which segments and sources require load reductions to achieve WQOs. This evaluation identifies the scientifically feasible solutions. The determination of

scientific feasibility should take into account the location of sources relative to the impairment and the critical conditions and potential seasonal load reduction needs.

Within the scientific constraints, those solutions that can achieve WQOs can be further evaluated. Loading scenarios may be adjusted in accordance with the administering agencies' policies and procedures and taking political, social, and economic factors into consideration. For instance, it may be decided that the reductions within a region are best spread out across all sources, or it may be decided to apply them to only a few targeted sources. The criteria for making these decisions (e.g., magnitude of impact, degree of management controls in place, feasibility, probability of success, cost) must also be established. The following represent a sampling of the factors that might need to be considered when making allocation decisions:

- Assessing alternatives
- Achieving a balance between WLAs and LAs
- How allocations can be translated into controls
  - Translate WLAs into NPDES permit requirements
  - Translate load allocations into implementation plans
- How issues of equity in allocations should be addressed
- How stakeholders should be involved

Relevant Legal Memos

Legal memos in Appendix B that might affect the allocation analysis include

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

Table 5-5 lists 19 different allocation schemes that can be considered when evaluating groups of sources that can be reduced. When performing analyses of source allocations, limitations for individual discharges and local impacts must still be protected.

Another consideration is the use of pollutant trading concepts to help optimize cost while fulfilling load reductions. (See box on Water Quality Trading on page 5-20.) Final loading scenarios can be represented as annual, seasonal, or daily loads for individual point sources and categories or subcategories of nonpoint sources. The selection of the appropriate time period and level of discretization of sources will depend on the impairment type and associated critical conditions. The level of specificity of the source loading allocation may vary from individual source, to categories of sources, within watersheds or subwatersheds. For point source discharges, the waste load allocations for TMDLs must generally include individual allocations. Further details of source management may be added during the implementation of the regulatory actions.

Table 5-5. Waste Load Allocation Methods

1.	Equal percent removal (equal percent treatment)
2.	Equal effluent concentrations
3.	Equal total mass discharge per day
4.	Equal mass discharge per capita per day
5.	Equal reduction of raw load (pounds per day)
6.	Equal ambient mean annual quality (mg/L)
7.	Equal cost per pound of pollutant removed
8.	Equal treatment cost per unit of production
9.	Equal mass discharged per unit of raw material used
10.	Equal mass discharged per unit of production

11a.	Percent removal proportional to raw load per day
11b.	Larger facilities to achieve higher removal rates
12.	Percent removal proportional to community effective income
13a.	Effluent charges (pounds per week)
13b.	Effluent charge above some load limit
14.	Seasonal limits based on cost-effectiveness analysis
15.	Minimum total treatment cost
16.	Best Available Technology (BAT) for industry, plus some level for municipal inputs
17.	Assimilative capacity divided to require an "equal effort among dischargers"
18a.	Municipal: Treatment level proportional to plant size
18b.	Industrial: equal percent between best practicable technology (BPT) and BAT
19.	Industrial discharges given different treatment levels for different stream flows and seasons

Source: Chadderton, R., A. Miller, and A. McDonnell, 1981. Analysis of wasteload allocation procedures. *Water Resources Bulletin* 17(5):760-66. (As cited in USEPA's *Technical Support Document for Water Quality-based Toxics Control.* 1991 (EPA/505/2-90-001).

5.5. Project Report

The Project Report should fully document the steps and outcomes of project analyses. For TMDL projects, the report should document all the required TMDL elements and any supporting information that will facilitate public understanding, and review and approval by the RWQCB, SWRCB, and USEPA. The amount and detail of information included in the project report will often be dictated by professional judgment and the specifics of the analyses. For relatively simple analyses, technical information can likely be documented in the main body of the report while, for more complex, detailed analyses, it may be beneficial to include technical information in one or more appendices with only a brief summary of the overall approach included in the main document. Appendix D provides a template for preparing a TMDL report consistent with California and USEPA Region 9 guidance.

The analyses performed should also be documented in the Administrative Record. This record provides a file of all the relevant material generated throughout the project. For project analyses, this file includes data, spreadsheets, model files, and notes. Documenting this information is essential during the course of the project. Materials generated and saved during the process will be needed should the conclusions of the analyses be legally contested. Do not expect to remember the details of how the analyses were done—document during the process! The sidebar describes some of the key information stored in the Administrative Record.

Administrative Record

An Administrative Record should be developed for TMDL projects to document the technical analysis, assumptions, and calculations. The Administrative Record makes it possible to defend the scientific analyses and associated assumptions, especially in cases where the supporting environmental data are limited. The Administrative Record will likely include

- TMDL document
- Public comments and responses
- List of references used in developing the TMDL (e.g., source of literature values used in modeling analysis)
- Spreadsheets of data analyses
- Spreadsheets used in TMDL calculation
- Modeling input and output files

No additional information may be added to the Administrative Record after final submittal to USEPA. Therefore, it is important to maintain a complete Administrative Record throughout TMDL development and prior to final USEPA decisions.

Summary of USEPA's Water Quality Trading Policy

(Source: USEPA's Fact Sheet on Water Quality Trading Policy, http://www.epa.gov/owow/watershed/trading/tradingpolicy.html)

Water quality trading is a market-based approach to improve and preserve water quality. Trading can provide greater efficiency in achieving water quality goals in watersheds by allowing one source to meet its regulatory obligations by using pollutant reductions created by another source that has lower pollution control costs. EPA's policy endorses trading as an economic incentive for voluntary pollutant reductions from point and nonpoint sources of pollution and as a way to achieve ancillary environmental benefits such as creation of habitat.

The Environmental Protection Agency (EPA) is issuing a Water Quality Trading Policy ("policy") to provide guidance to states and tribes on how trading can occur under the Clean Water Act and its implementing regulations. The policy discusses Clean Water Act (CWA) requirements that are relevant to water quality trading including: requirements to obtain permits, antibacksliding provisions, development of water quality standards including antidegradation policy, National Pollutant Discharge Elimination System permit regulations, total maximum daily loads (TMDLs) and water quality management plans.

EPA's policy supports trading of nutrients (e.g., total phosphorus, total nitrogen) and sediment load reductions. The policy recognizes the potential for environmental benefits from trading of pollutants other than nutrients and sediments but believes that these trades may warrant more scrutiny. The policy does not support any trading activity that would cause a toxic effect, exceed a human health criterion or cause an impairment of water quality. EPA does not support trading of persistent bioaccumulative toxic pollutants at this time.

The policy supports trading to improve or preserve water quality in a variety of circumstances. For example, in unimpaired waters trading may be used to preserve good water quality by offsetting new or increased discharges of pollutants; in waters impaired by pollutants trading may be used to achieve earlier pollutant reductions and progress towards water quality standards pending the development of a TMDL; and trading may be used to reduce the cost of achieving reductions established by a TMDL. EPA does not support trading that delays implementation of an approved TMDL.

The policy draws on lessons learned from pilot programs conducted under EPA's 1996 *Draft Framework for Watershed-Based Trading* by identifying common elements that EPA believes are necessary for trading programs to be credible and successful. These elements include clearly defined units of trade, use of standardized protocols to quantify pollutant loads and reductions, provisions to address the uncertainty of nonpoint source loads and reductions that are traded, accountability mechanisms for all trades, public participation and access to information, and monitoring and program evaluation.

Useful links:

USEPA's Water Quality Trading Web page, http://www.epa.gov/owow/watershed/trading.htm

USEPA's 2003 *Water Quality Trading Policy*, http://www.epa.gov/owow/watershed/trading/tradingpolicy.html

Case Studies, http://www.epa.gov/owow/watershed/hotlink.htm

USEPA Region 10's *Water Quality Trading Assessment Handbook*, http://yosemite.epa.gov/R10/OI.NSF/Effluent+Trading/ET

6. REGULATORY ACTIONS

RWQCBs have wide latitude, numerous options, and some legal constraints when determining how to address impaired waters. The process for addressing waters that do not meet applicable standards can be accomplished through several existing regulatory tools and mechanisms, one of which is the calculation and implementation of a TMDL. Chapters 1–5 of this document describe the foundation for identifying and understanding the issues to consider when addressing impaired waters in California. In Chapter 1, a summary of the important background information on the regulatory requirements is presented to ensure that the reader understands the context of this document, but the summary is not intended to provide details on how to select the appropriate regulatory action. Although the information in this chapter does not provide definitive answers, it does provide additional information and limited guidance on issues to consider when deciding how best to address impaired waters, including whether or not Basin Plan amendments are required.

6.1. Understanding Regulatory Action Options

Understanding the regulatory and nonregulatory options available to address impaired waters in California can be a challenging task. Because of the number of choices and the need to know when and where they are appropriate, it is important that analysts working on these projects understand the entire process and identify their options (including when a Basin Plan amendment will be required) at the beginning of each project. Most of the options available have been identified in other chapters and they can be summarized as follows:

- Delisting when standards are appropriate and are being met. This action requires documentation justifying the decision. No Basin Plan amendment is required.
- Standards are inappropriate. When changing the standard, the objective, or the use, a Basin Plan amendment is required, along with all relevant documentation.
- Impairment can be redressed by a single action (e.g., single NPDES permit, enforcement action). No Basin Plan amendment is required for TMDL implementation.
- Impairment cannot be redressed by a single action (e.g., develop an implementation plan). A Basin Plan amendment is required.

Any of these regulatory actions (or combinations of them) may be pursued given appropriate site-specific circumstances. Figure 6-1 presents the decision process for identifying the most appropriate regulatory action and the associated Basin Planning requirements, if applicable. An action should be identified early in the process so that the technical analysis; level of public, stakeholder, or board involvement and notice; and required documentation can be planned. In some cases, the original desired path will lead to a different path because of unforeseen circumstances. Such circumstances should be anticipated and alternate paths should be considered when planning the project.

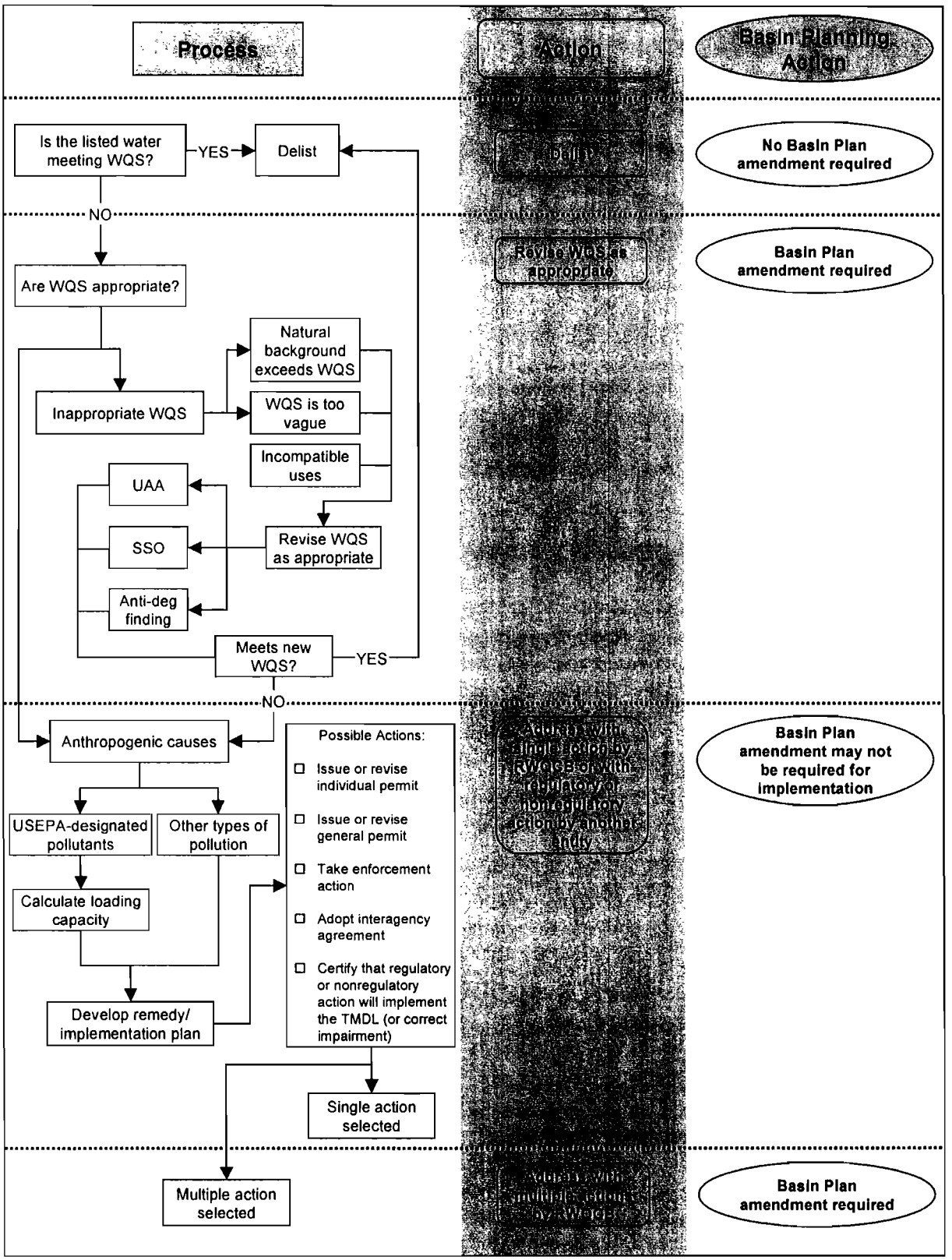


Figure 6-1. Regulatory Decision Tree

6.2. Selecting the Most Appropriate Regulatory Action

The decision process for selecting the appropriate path should take into account the questions presented in the box below. (Details on the requirements for each path are included in California's *Administrative Procedures Manual,* Chapter 8, Water Quality).

Is the water currently attaining standards?

If **YES**, the water should be delisted.
If **NO**, why?

- Do natural background levels exceed the WQOs?
- Are the WQOs too broad or vague?
- Do incompatible uses exist?
  - If **yes**, revise WQS as appropriate (e.g., UAA, SSO)
- Are discharges exceeding the WQS-based loading capacity?
  - If **yes**, calculate TMDL and develop an implementation plan

Can the cause of impairment be redressed by a single vote of the Regional Board?

If **YES, one** of the following actions **may** be appropriate to implement the TMDL:

- Issue or revise an individual permit
- Issue or revise general permit
- Take enforcement action
- Adopt interagency agreement

Can the cause of the impairment be redressed by a regulatory action of another local, state, or federal agency?

If **YES**,

- Certify that the regulatory action will implement the TMDL.

Can the cause of impairment be redressed by a nonregulatory action of another entity?

If **YES**,

- Certify that the regulatory action will implement the TMDL.

Will the cause of the impairment be redressed through multiple actions of the RWQCB alone or with other entities?

If **YES**,

- Adopt a Basin Plan amendment that guides staff in implementing the TMDL, using any of the above tools.

In most cases, the likely suite of regulatory actions available to address impaired waters can be identified from the onset. For example, if a combination of point and nonpoint sources is contributing pollutants under both wet and dry conditions, a single NPDES permit is not likely to address the impairment. Likewise, waters with several large dischargers, all contributing significant pollutant loads and all requiring revisions to their NPDES permits, cannot be redressed with a single vote. For cases such as these, the analyses will focus on the appropriateness of the standards and objectives and, assuming they are appropriate, the calculation of a TMDL. Selection of the regulatory actions will result in requirements associated with establishing TMDL and amendments of Basin Plans. Key requirements for each process are described below.

6.3. Process for Implementing the Most Appropriate Regulatory Action

Sections 6.1 and 6.2 outlined the suite of regulatory action options and provided guidance on how to determine the most appropriate option. This section provides guidance on how to implement the most appropriate option, whether it is to delist the waterbody, conduct a UAA or develop an SSO where the standard is inappropriate, or calculate a TMDL and draft an implementation plan. The reader should refer to Section 3.1 of this document for more detailed information on the types of data, information, and products associated with each of these options.

Delisting of Waterbody/Pollutant Combination(s)

The option to delist a waterbody is included as a regulatory action, despite no requirement for a Basin Plan amendment, because a plan amendment is not an appropriate method for removing a waterbody from the 303(d) list. The decision to delist should be based on an analysis of available data and comparison with WQS. The justification for delisting must be well documented because the decision is subject to public, SWRCB, and USEPA scrutiny. Although details on the delisting process will be outlined in the upcoming draft of the *Guidance on Assessing California Surface Waters* and will not be presented in this document, the types of information that should be included in delisting documentation include

- Cover memo that summarizes the findings of the data analysis
- Project report that includes watershed characterization, results of statistical data analysis, comparison with WQS, and conclusions
- Administrative Record

An example of a template for a delisting memo and staff report is included in Appendix D.

Use Attainability Analysis or Site-Specific Objective

If the determination is made that a waterbody is impaired and delisting is not appropriate, it may be appropriate to review the water quality standards to determine whether the designated uses and/or applicable objectives are appropriate (Appendix C).

Reviewing the appropriateness of standards is complex and involves processes that generally are beyond the scope of TMDL process (and this guidance document). Review of standards generally occurs in the triennial review process. The TMDL process is not designed to evaluate the appropriateness of standards, but to create a strategy to attain those standards that have already been

UAAs and SSOs

Ideally, beneficial uses are determined through a UAA. UAAs are "a structured scientific assessment of the factors affecting the attainment of a use which may include physical, chemical, biological, and economic factors..." (40 CFR 131.10(g)). There are four types of situations in which a UAA may be considered: (1) when a waterbody is considered impaired (i.e., 303(d) listed) but the use (and therefore, associated water quality standards) appear to be inappropriate or the use does not exist; (2) when adopting subcategories of a use that require less stringent criteria; (3) when the use does not appear to be attainable; and (4) when meeting the use would likely result in substantial and widespread economic and social impact" (40 CFR 131.10(g)).

SSOs or refinements in the water quality objective are often considered when a numeric objective is in question (e.g., copper or chloride standard) and not the use itself. Refinements to the objective may be appropriate if the water quality objective was based on questionable or inappropriate water quality information. For example, many priority pollutant metal objectives are based on water hardness. If an incorrect hardness was assumed for the site, the objective would be incorrect as well. In these instances, collection of appropriate water quality data may be used to refine the existing objective for the waterbody in question, and changes are made in terms of the data used to calculate the objective, not the objective itself.

established. Irrespective, it is always necessary to review the standards applicable to the listed waterbody to determine the appropriate target(s).

While in most cases the existing standards are appropriate and amenable to TMDL development, in some circumstances, investigation during the development of a TMDL reveals that the standards may be inappropriate or imprecise, thus rendering water quality attainment impossible through the TMDL process. This may be for any of a number of reasons. For example, some impairments have been shown to be from nonanthropogenic sources, in which case a standards action may be the most appropriate (or indeed, the only possible) corrective action. Additionally, some of the existing criteria assume a default set of parameters (e.g., the metals criteria) that may not be appropriate for the subject water body. For those constituents a site-specific objective may be an appropriate action apart from, or in addition to, source control measures. Likewise, it may be appropriate to consider seasonal or subcategories of uses, or refinements to objectives to allow consideration of the dynamic or variable conditions that exist and often affect the assimilative capacity of the water body.

The Clean Water Act contains detailed provisions regarding how to conduct a standards action. If a standards action is warranted, all applicable authorities, including but not limited to those set forth in part 131 of Title 40 of the Code of Federal Regulations and Article 3 of Division 7, Chapter 4 of the California Water Code, must be followed. It is not anticipated that a standards action will often be required as a result of the TMDL establishment process; however, it is appropriate that the TMDL process be designed to address the situation when it is required. It would be inappropriate, for instance, to adopt stringent source reduction measures for the ostensible purpose of protecting a beneficial use that natural background levels of pollutants would prevent achieving, and thus some sort of standards action is the only appropriate regulatory response.

In current practice, there are two types of conditions under which the need for a UAA may arise: (1) when a waterbody is considered impaired (i.e., 303(d) listed) but the use (and therefore, associated water quality objectives) may not be attainable, and (2) when considering whether an upgraded or different use from that designated is appropriate. A change of the use is appropriate in either of these conditions. If the designated use is known to be, or was, an existing use since November 1975, the use cannot be changed, and a UAA is not appropriate. In these cases, SSOs may be appropriate. Both the UAA and SSO options require a Basin Plan amendment and all required supporting documentation. The documentation for a UAA should include (from Chapter 8, *Administrative Procedures Manual*):

1. A staff report that includes
   - A description of existing conditions
   - Consideration of reasonable alternatives
   - A description of mitigation measures (see California Environmental Quality Act [CEQA] checklist)
   - Rationale for selecting the recommended approach
   - Consideration of economics
   - Consideration of antidegradation

   For a UAA, the report should also include
   - Demonstration that use cannot be attained because of
     - Naturally occurring pollutants
     - Naturally intermittent or low-flow conditions
     - Human-caused conditions or sources that cannot be remedied
     - Dams, diversion, or other hydrologic modification
     - Natural physical features or conditions
     - Widespread economic and social impacts

For an SSO, the report should also include

- Past, present, and probable future beneficial uses
- Environmental characteristics, including quality of water
- Water quality conditions that could be reasonably achieved through coordinated control of all factors affecting water quality
- Economic considerations
- The need for developing housing in the region
- The need to develop and reuse recycled water

Relevant Legal Memos

Legal memos in Appendix B that are relevant to establishing SSOs include

- *The Extent to Which TMDLs Are Subject to the Alaska Rule*
- *Guidance on Consideration of Economics in the Adoption of Water Quality Objectives*

2. An environmental checklist (http://ceres.ca.gov/topic/env_law/ceqa/guidelines)

3. A draft amendment containing the language to be inserted or deleted from the Basin Plan. This should be limited to regulatory language—all background information should be contained in the staff report.

4. A draft resolution to adopt the amendment. The *Administrative Procedures Manual* gives an example of a draft resolution.

The following additional actions should be planned:

- External scientific peer review
- Hearing notice/Notice of filing
- Response to comments
- Adoption hearing
- Transmission of the administrative record

Calculation of TMDL and Development of an Implementation Plan

In general, TMDLs are established when programs are instituted to correct the impairment and result in attainment of water quality standards. For example, TMDLs may be reflected in the assumptions underlying a Basin Plan amendment or another regulation or policy for water quality control that is designed to guide the RWQCB in correcting the impairment. In this case, the TMDL is established by adopting the regulations that guide how the region will implement it.

Relevant Legal Memos

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

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

California TMDLs have traditionally been established through an amendment to a Regional Board's basin plan, largely because of the requirements of the California Administrative Procedure Act. That Act prohibits the adoption of regulations (including plans, policies, and other rules of general application) unless they have been adopted in accordance with the Act's requirements. This is commonly referred to as the prohibition against "underground regulations." Implementing a TMDL usually requires a plan of some sort, since numerous dischargers are typically responsible for contributing to the impairment. Therefore, numerous regulatory actions will be required, and mutually dependent requirements will be imposed upon each discharger to achieve the assumptions of

the TMDL. Accordingly, a plan is necessary to guide the Regional Board's implementation activities. In those situations, the elements of the TMDL (the loading capacity, the load and wasteload allocations, and the margin of safety) have been established through a basin plan amendment, along with the plan to implement the TMDL. Subsequently, permits or other quasi-adjudicative actions are taken, pursuant to the terms of the plan, to implement it.

However, in some circumstances a single discharger may be responsible for the impairment or a single order of the Regional Board may be adequate to address the impairment. In such instances, there is no legal requirement to first adopt a plan to correct the impairment before actually imposing requirements that do so. Since "the plan" to correct the impairment can be accomplished through a single permitting or other quasi-adjudicatory action, the "planning" step is redundant, and the TMDL can be both established and implemented through that single action. The Regional Board has the authority to issue a permit or an enforcement action without first adopting a regulation (basin plan amendment) instructing itself to undertake that single permitting or enforcement action. In these situations, the TMDL elements will be established and included within the permit or order.

This direct process does not absolve the Regional Board from incorporating the TMDL into California's water quality management plan. All TMDLs must be incorporated directly (or by reference if contained in separate documents) into California's water quality management plan, as described in 40 CFR 130.6(c)(1). (See 40 CFR 130.7(d)(2).) This requirement is not a function of CWA Section 303(d)(1) (regarding establishing TMDLs), but of Section 303(d)(2), which sets forth the approval process and requirements for TMDLs that have been established and approved by USEPA. The Regional Boards' water quality control plans (or basin plans) are components of the water quality management plan described in 40 CFR 130.6(c)(1). The basin plans are the primary venue to incorporate those TMDLs. However, since the permit or order is not dependent upon new authority conferred by the basin plan amendment, such incorporation may merely be an informational item, or a change without regulatory effect. (See Cal. Code Regs. Tit. 1 § 100.) Since TMDL establishment and implementation are not dependent upon such changes, they may be incorporated when another basin plan amendment is presented to the Regional Board, or during the triennial reviews, rather than as an additional regulatory hoop before establishing each TMDL.

The documentation for a Basin Plan amendment (Figure 6-2) for incorporating a TMDL should include the following (from Chapter 8, *Administrative Procedures Manual*; also see the checklist outlining the steps of the basin planning process in Appendix A):

1) A staff report that includes
   - A description of existing conditions
   - Consideration of reasonable alternatives
   - A description of mitigation measures (see CEQA checklist)
   - Rationale for selecting the recommended approach
   - Consideration of economics
   - Consideration of antidegradation

2) An environmental checklist (http://ceres.ca.gov/topic/env_law/ceqa/guidelines)

3) A draft amendment containing the language to be inserted or deleted from the Basin Plan. This should be limited to regulatory language—all background information should be contained in the staff report.

4) A draft resolution to adopt the amendment. The *Administrative Procedures Manual* gives an example of a draft resolution.

The following are other actions that should be planned:

- External scientific peer review
- Hearing notice/Notice of filing
- Response to comments
- Adoption hearing
- Transmission of the administrative record

For TMDLs adopted via a Basin Plan amendment or other regulation or policy for water quality control that is designed to guide the RWQCB in correcting the impairment, the Division of Water Quality should not transmit the TMDL for approval until the Office of Administrative Law has concluded any applicable review of the regulations implementing the TMDL.

Relevant Legal Memos

The following legal memo in Appendix B is relevant to USEPA review of TMDLs and water quality standards:

- *The Extent to Which TMDLs Are Subject to the Alaska Rule*

For TMDLs adopted through a permitting action, enforcement action, or other single regulatory action that is designed, by itself, to correct the impairment, the TMDL should be transmitted to USEPA for approval by the RWQCB's Executive Officer. The Division of Water Quality has prepared a standard transmittal form for use by the RWQCBs. The RWQCB should not transmit the TMDL for approval until either the time to file a petition for review with the SWRCB has elapsed, or the SWRCB has dismissed any petitions challenging, or has otherwise approved, the certification or order. A copy of each transmittal by an RWQCB is to be sent to the Division of Water Quality.

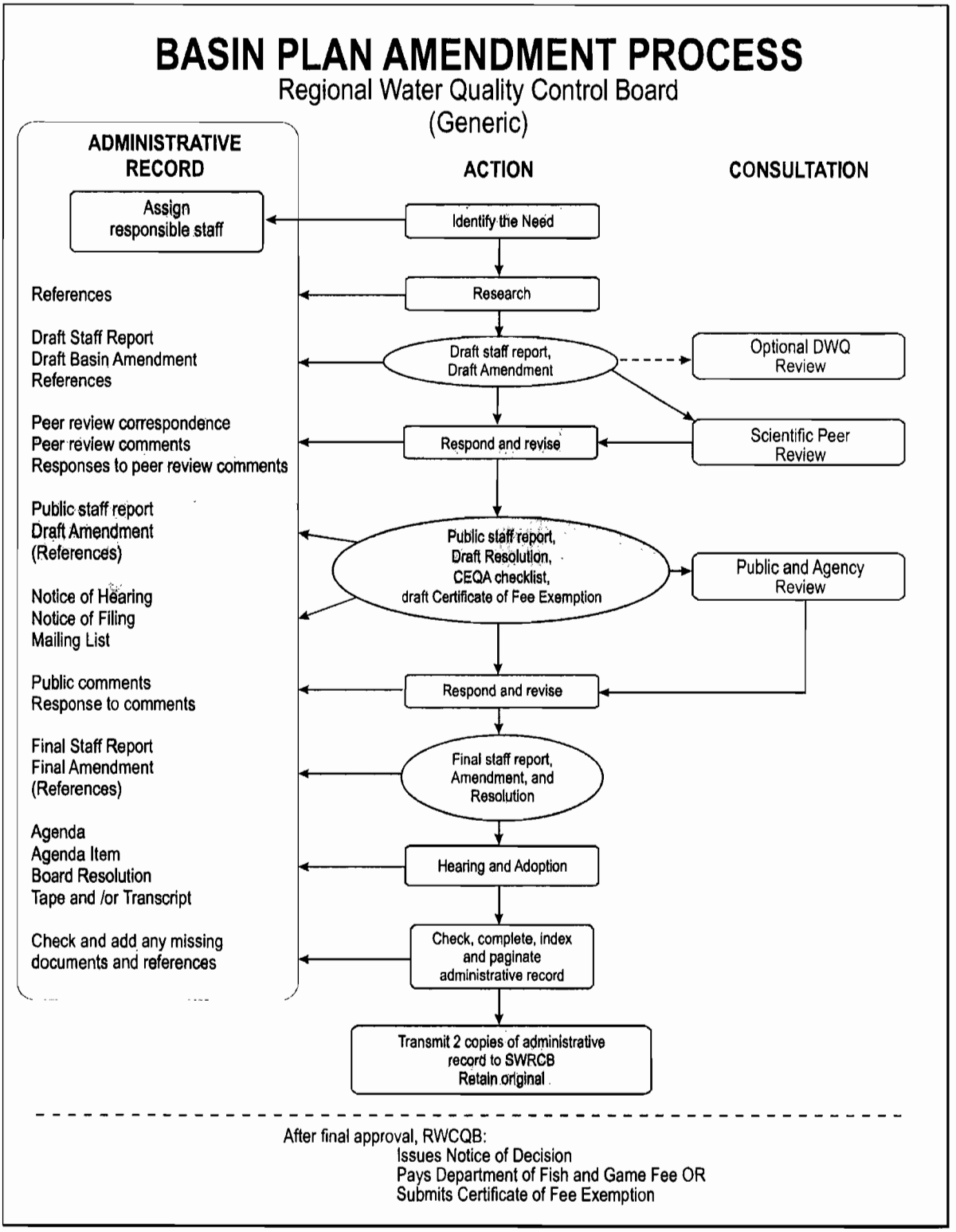


Figure 6-2. Basin Plan Amendment Process

Regardless of the implementing program, the RWQCB has the responsibility to determine the loading capacity (LC) (the TMDL) for the waterbody and the load reductions necessary (considering seasonal variations and a margin of safety) to attain standards. The RWQCB must then exercise its independent discretion to determine whether or not an implementation program is consistent with the LC. In some circumstances the implementation program may have been adopted by another regulatory or non-regulatory entity. On these occasions the RWQCB may not always need to adopt its own implementation program, but may instead rely upon the program adopted by the other entity. When doing so, the RWCQB should establish the TMDL via a resolution, which certifies that RWQCB has determined that the other entity's program will comply with the TMDL and attain standards. In doing this, the RWQCB must demonstrate in the resolution that the implementing program is consistent with the assumptions and requirements of the TMDL, that sufficient mechanisms exist to provide reasonable assurances that the program will address the impairment in a reasonable period of time, and that sufficient mechanisms exist to ensure that the program will be enforced, or that the RWQCB has sufficient confidence that the program will be implemented, such that further regulatory action by the RWQCB is unnecessary and would be redundant.

The determination of whether the implementation mechanisms are reasonable should be made on a TMDL-by-TMDL basis and should take into account the level of confidence associated with the project specifics. For example, a TMDL implementation plan that outlines relatively few required management practices by few affected (and known) parties might result in greater confidence in the implementation and success of the plan with less RWQCB oversight. Conversely, an implementation plan that outlines a complex, uncertain strategy for attaining standards might result in lower confidence in success and would dictate the need for greater RWQCB oversight and inclusion of sufficient fallback provisions to ensure that the impairment will be addressed in a reasonable period of time if the program is unsuccessful. Such fallback provisions should include instructions that RWQCB staff will commence a regulatory response if the impairment has not then been addressed within a specified time period. These TMDLs should also be referenced in the Basin Plan within a reasonable time after its establishment.

Employing these abbreviated procedures when warranted is a matter of efficiency and resource allocation. California is obligated to establish and implement 800 or more TMDLs over the next ten years for over 1,800 pollutant/water body combinations. Given existing resource constraints (both financial and personnel), to the extent California can consolidate regulatory actions or eliminate unnecessary regulatory processes when fulfilling our obligations under Section 303(d), the State and Regional Boards can expedite their responsibility to address and correct impaired waters in California, and expend resources on more TMDLs instead of redundant processes.

7. DEVELOPMENT OF AN IMPLEMENTATION PLAN

The information presented in Chapters 1 through 6 focuses on the technical and regulatory options analysts should consider when identifying how to effectively restore and support beneficial uses. Chapter 1 also introduced the concept of implementation planning, which emphasizes the need to consider possible management practices early in the project planning. By thinking about possible implementation options from the early phases of the project, the analyst will have facilitated the development of a detailed implementation plan that provides a road map of the control strategies, responsible agencies, and funding sources.

Adaptive Implementation

"Adaptive implementation is, in fact, the application of the scientific method to decision-making. It is a process of taking actions of limited scope commensurate with available data and information to continuously improve our understanding of the problem and its solutions, while at the same time making progress toward attaining the water quality standards." (NRC, 2001)

Because an implementation plan will often identify actions that have unknown or uncertain efficiencies, it is important that it be flexible to the need for change over time. The concept of adaptive implementation is important because it encourages the continuous adjustment and re-evaluation of methods and regulatory actions to ultimately achieve the goal of water quality standards attainment through environmental restoration. In California, adaptive implementation is the natural result of the project phases and implementation process as shown in the schematic diagram in Figure 7-1. Adaptive implementation considers the learning process inherent in the management process by allowing for short- and long-term actions, testing of new methods, and incremental evaluation of progress. If monitoring and surveillance during the implementation process indicate that the interim milestones are not being achieved, three options are possible: (1) the implementation can continue, (2) the implementation practices can be adjusted or new practices initiated, or (3) the regulatory actions can be revised by revisiting phases 1 through 7.

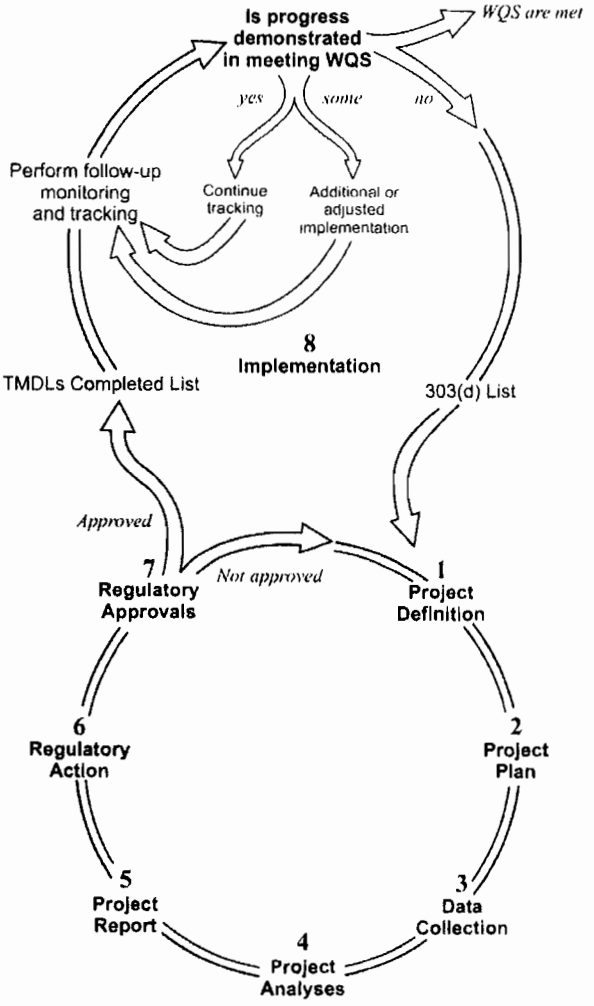


Figure 7-1. Adaptive Implementation Process