UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, Ca. 94105-3901
June 17, 1992

MEMORANDUM

SUBJECT: EPA Region 9's Interim Final "Guidance for Modifying Water Quality Standards and Protecting Effluent-Dependent Ecosystems"

FROM: Catherine Kuhlman, Chief
Water Quality Branch (W-3)

TO: Interested Parties

Enclosed, is EPA Region 9's Interim Final "Guidance for Modifying Water Quality Standards and Protecting Effluent-Dependent Ecosystems".

This guidance is the result of a two year review process by state agencies, dischargers, and the environmental community and reflects many of the comments we received on earlier drafts. During this extensive review process, a fruitful discussion and exchange of ideas about the issues of effluent-dependent streams in the arid West emerged. We hope that the guidance strikes the balance between protection of designated uses, preservation of aquatic and riparian habitats, and the benefits of water reclamation.

This guidance focuses on existing methods that may be used to modify designated uses, water quality criteria, and water quality-based effluent limits so that they better reflect the conditions of the arid West. It is important to emphasize that this guidance does not fully describe all of the options available to modify water quality standards and their associated permits. Instead, the guidance focuses on the methods that we believe are the most appropriate for addressing the water quality issues associated with effluent-dependent streams.

This guidance introduces the "Ecological Benefit Comparison" approach and caters it to the conditions found in effluent-dependent ecosystems. The basic approach of an Ecological Benefit Comparison is a demonstration that the ecological value of using an effluent to support riparian and aquatic habitats exceeds the ecological benefits of removing the discharge from the water body. The guidance describes the conditions where a net ecological benefit will allow a designated use to be modified or removed. To provide for the best possible use of the effluent and management of the stream and ecosystem, we recommend that the Ecological Benefit method be applied to an entire watershed.

The Ecological Benefit Comparison is an untested approach. Therefore, Region 9 is releasing this guidance as "Interim Final" so that, if need be, it may be modified to account for issues that arise during its implementation. EPA encourages interested states, and members of the regulated and environmental communities to evaluate which streams may be suitable candidates for this approach. Finally, EPA Region 9 is committed to continue working with regulatory agencies, impacted dischargers and the public to resolve the issues concerning effluent-dependent streams in the arid West.

GUIDANCE FOR MODIFYING WATER QUALITY STANDARDS AND PROTECTING EFFLUENT-DEPENDENT ECOSYSTEMS

EPA Region 9 Guidance
INTERIM FINAL
June, 1992

Prepared by:

Rebecca Tuden
David Smith
Maria Rea

EXECUTIVE SUMMARY

Statement of the Issue

The Clean Water Act establishes a goal that all of the nation's waters, where attainable, should provide for the protection and propagation of fish, shellfish, and wildlife and provide for recreation in and on the water. However, the hydrologic conditions of some water bodies in the arid West may create conditions where the full range of designated uses and criteria are not always appropriate. High treatment costs associated with inappropriate beneficial use designations, their associated water quality criteria, and little or no dilution for the treated waste water may encourage dischargers to remove effluent from waters that currently support effluent-dependent aquatic and riparian ecosystems, with the consequent loss of those ecosystems. High costs of treatment may have the effect of discouraging water reclamation projects that require some discharge to the stream.

In such cases, it may be appropriate to modify the designated uses and their resulting water quality criteria and water quality-based effluent limits to better reflect the conditions in the arid West. EPA Region 9 intends to help states and dischargers use existing flexibility in the federal regulations to:

- comply with applicable water quality standards and permit requirements;
- help preserve or create in-stream flows that support desirable ecosystems located in and areas; and
- encourage the broad development of water reclamation.

Discussion of Options Available for Effluent-Dependent Streams

The Clean Water Act and its regulations establish four methods for modifying standards that can address the conditions of effluent-dependent water bodies while ensuring that existing uses are fully protected. This guidance clarifies potential application of these methods in the arid West. Before attempting to use these methods, we encourage states and dischargers to consult with EPA. We also strongly urge dischargers to explore available pollution prevention measures (such as source control and pretreatment methods) before considering these options.

Method 1: Total Maximum Daily Load (TMDL) Analysis

The TMDL process involves the calculation of a water body's pollutant loading capacity and the allocation of allowable pollutant loads among point and nonpoint source (NPS) dischargers. TMDLs may allow a state or discharger to show that water quality-based effluent limits for particular pollutants should be modified based on the total pollutant loading capacity of a water body. TMDLs may be designed to reflect seasonal variations of instream flows.

Method 2: Alternate Water Quality Criteria

This method enables a state to determine that water quality criteria for a specific water body, or groups of water bodies, should be different from the currently applicable criteria. Alternate criteria are appropriate where physical and/or chemical characteristics of a specific water body alter the toxic effects of certain pollutants or where the species present in the water are more or less sensitive than the species used in developing the current criteria.

Method 3: Ecological Benefit Comparison (Use Attainability Analysis)

A Use Attainability Analysis (UAA) may be applied only if the existing uses will be protected and all controls required by sections 301(b) and 306 as well as reasonable and effective best management practices for nonpoint sources have been implemented. The Ecological Benefit Comparison should be considered when an existing discharge supports or enhances an ecologically valuable riparian or aquatic habitat. This method enables dischargers to show that the ecological benefits of continuing an effluent discharge exceed the ecological benefits of removing the discharge from the water body.

EPA generally expects a positive demonstration of the following conditions in order to approve a UAA based on a net ecological benefit:

1. The water body is in a primarily and area such that aquatic resources are limited and ecologically valuable. The water body supports an ecologically desirable aquatic, wetland, or riparian ecosystem and supports native plant species and wildlife. For new discharges, the water body must have the potential to support such ecosystems.

2. Effluent discharges do not produce or contribute to concentrations of pollutants in tissues of aquatic organisms or wildlife that are likely to be harmful to humans or wildlife through food chain concentration.

3. The discharger documents that a feasible plan to remove the discharge is under consideration.

4. The analysis demonstrates that a continued discharge to the water body has not caused and is not likely to cause or contribute to violations of downstream water quality standards or degradation of groundwater basins.

5. All practicable pollution prevention programs, such as pretreatment and source reduction, are in operation. The discharger verifies that it has responded appropriately to previous and on-going compliance actions.

6. In order to preserve the net ecological benefits associated with the discharge, it is recommended that the discharger commit to providing effluent to the stream that is sufficient to protect and maintain the ecological benefit as determined by EPA, and state and federal wildlife agencies.

The Ecological Benefit Comparison may also be applied to new discharges. However, demonstrating a net ecological benefit that results from a new discharge is often more difficult because the proposed habitat values can only be estimated. In all cases, EPA both requires and emphasizes an opportunity for extensive public comment when undertaking an Ecological Benefit

Comparison. EPA also expects states and dischargers to work with resource management agencies such as U.S. Fish and Wildlife Service and its counterpart state agencies to structure and interpret an Ecological Benefit Comparison.

Method 4: Economic Feasibility Analysis (Use Attainability Analysis)

A Use Attainability Analysis (UAA) may be applied only if the existing uses will be protected and all controls required by sections 301 (b) and 306 as well as reasonable and effective best management practices for nonpoint sources have been implemented. The Economic Feasibility method considers the economic and social impacts associated with the cost of effluent treatment needed to attain the designated uses. States and dischargers should consider applying this method when they believe they have sufficient information to demonstrate that attaining the designated use will cause "widespread and substantial social and economic impact" to the defined community. It may be appropriate to factor into the analysis forgone economic benefits of water reclamation projects not undertaken because of high compliance costs. Public participation is an essential element of this analytical process.

Obtaining Time Needed To Perform Necessary Studies

EPA Region 9 recognizes that the methods discussed in this guidance may be time-consuming to apply. In, cases where evidence exists that it may be appropriate to modify criteria, designated uses, waste load allocations, and their water quality-based effluent limits, states could develop compliance schedules, standards variances, or enforcement orders. These approaches would define a reasonable study period needed to apply these methods. These approaches would also establish implementation schedules for complying with effluent limits that would, at a minimum, protect existing water quality and uses.

Conclusion

EPA Region 9 is committed to working with regulatory agencies, impacted dischargers and the public to resolve the issues concerning effluent-dependent streams in the arid West. EPA Region 9 recognizes that it may be necessary to modify water quality criteria, uses, and their water quality-based permits to accurately reflect the conditions in the arid West. This guidance offers a possible framework for striking the balance between protection of designated uses, preservation of valuable ecosystems, and the benefits of water reclamation.

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BACKGROUND

The Clean Water Act establishes a goal that all of the nation's waters, where attainable, should provide for the protection and propagation of fish, shellfish, and wildlife and provide, for recreation in and on the water. States designate uses and adopt water quality criteria to achieve the goals of the Act. However, the hydrologic conditions of some water bodies in the arid West may create conditions where the full range of designated uses and criteria are not always appropriate.

The instream flow of many water bodies in the arid West is comprised primarily of discharges caused by human activities, including wastewater effluent, irrigation return flows, reclaimed water discharges, and flows from urban runoff. These discharges often support or have the potential to create ecologically valuable aquatic, wildlife, and riparian habitats in water bodies that would otherwise be dry or nearly dry. High treatment costs associated with inappropriate beneficial use designations, their associated water quality criteria, and little or no dilution for the treated waste water may encourage dischargers to remove effluent from waters that currently support effluent-dependent aquatic and riparian ecosystems, with the consequent loss of those ecosystems. High costs of treatment may also have the effect of discouraging water reclamation projects that require some discharge to the stream.

1.0 GOALS OF THE GUIDANCE

The intent of this guidance is to recognize that EPA's national uses, water quality criteria and resulting effluent limits may not always be appropriate when applied to the conditions that exist in effluent-dependent water bodies in the arid West. This guidance seeks to clarify the existing flexibility in the Clean Water Act and federal regulations that allows for the modification of these uses and the water quality criteria and effluent limits associated with them.

Another goal of this guidance is to allow for the preservation of ecologically valuable riparian habitats. Under certain conditions, the value of providing riparian habitat in an otherwise dry area using treated effluent may provide more benefit than attaining the designated uses. This guidance includes a discussion of how those conditions may be met.

Additionally, this guidance intends to encourage the broad development of effluent re-use and reclamation, where appropriate.

EPA Region 9 is committed to working with regulatory agencies, impacted dischargers and the public to resolve the issues concerning effluent-dependent streams in the arid West. We recognize that it may be necessary to modify water quality criteria, uses and the water quality-based permits associated with them to accurately reflect the conditions in

the arid West. Case-by-case decisions about water resources and conditions are highly complex and EPA emphasizes that public participation and discussion are required prior to making these decisions. This guidance offers a possible framework for striking a balance between protection of designated uses, preservation of valuable ecosystems, and the benefits of water reclamation.

2.0 WHEN TO APPLY THE GUIDANCE

This was written specifically to address the arid conditions of stream segments in states within EPA Region 9. This guidance should be consulted when developing and reviewing water quality standards for effluent-dependent waters in Region 9[1]. This guidance is intended to assist in the evaluation of discharge management options in the following general situations:

- A discharger is considering total or partial removal of an existing treated point source discharge from an effluent-dependent water body due to the anticipated costs of controls needed to meet water quality-based effluent limits.
- A project manager is considering whether to propose a new treated point source discharge to an effluent-dependent water body.
- A reclamation project is proposed that would require some discharge of treated water to an effluent-dependent water body; but where the costs of treatment necessary to comply with water quality standards are prohibitive.

The methods discussed in this guidance may be used to evaluate both existing and new projects.

In this guidance, EPA articulates for the first time its concepts that: (1) a Use Attainability Analysis may be based on the showing of a net ecological benefit and; (2) costs of forgoing a reclamation project may be relevant in showing widespread social and economic impact. These concepts will be implemented on a pilot basis by EPA Region 9 as outlined in this guidance. Any attempts to apply these concepts outside Region 9 must be coordinated with the appropriate EPA Regional Office.

3.0 DEVELOPING AND MODIFYING WATER QUALITY STANDARDS

The Clean Water Act requires states to protect water quality by developing water quality standards. Water quality standards consist of both designated uses and water quality criteria sufficient to protect those uses. To develop water quality standards, states first identify all attainable uses of a water body. Examples of such uses include fishing, swimming, and protection of aquatic life and wildlife. States then adopt these uses in their water quality standards as designated uses.

[1]See Appendix for the definition of effluent-dependent waters.

States then establish water quality criteria for a wide range of substances sufficient to protect the designated uses. Dischargers' effluent limits are based upon the water quality criteria. Criteria are usually expressed as maximum concentrations of individual substances that may be present in a water body without causing impairment of designated uses[2].

The Clean Water Act establishes a goal that, where attainable, all waters be "fishable-swimmable" [CWA, Section 101(a)(2)]. In implementing this goal, EPA requires that states designate all waters as “fishable-swimmable”. Uses may be designated as either existing or potential uses. An existing use is any use that has existed in the stream at any there since November 28, 1975 [40 CFR 131.3]. Existing uses must be fully protected and cannot be removed [40 CFR 131.12 (a)(1)]. A potential use is a use that has not existed in the water body since November 28, 1975. For example, an effluent-dependent stream may have "cold-water fishing" as a designated use, but if cold water fish have never existed in that stream, it is a potential use. A potential use may only be removed or modified through a formal Use Attainability Analysis.

4.0 GENERAL DISCUSSION OF USE ATTAINABILITY ANALYSIS, ALTERNATE CRITERIA AND TOTAL MAXIMUM DAILY LOAD ANALYSIS

Although the goal of the Clean Water Act is to ensure that all waters are "fishable-swimmable", the Act and its regulations do offer some flexibility to States to modify designated uses, water quality criteria, and the associated effluent limits to reflect local needs and conditions. This guidance focuses on four methods for modifying water quality standards and water quality-based permit limits in effluent-dependent streams:

1. Total Maximum Daily Load (TMDL) Analysis;

2. Alternate water quality criteria, such as site-specific criteria;

3. Ecological Benefit Use Attainability Analysis; and,

4. Economic Feasibility Use Attainability Analysis.

Although the processes discussed in this guidance can be applied to all waters, this guidance describes how they are best applied to effluent-dependent waters. EPA Region 9 is currently developing additional guidance which will help describe what type of technical, information is required for a Use Attainability Analysis in effluent-dependent waters [3].

[2]This guidance assumes that designated uses have been identified and water quality criteria adopted for the waters in question.

[3] This technical document will be available in September 1992.

Before modifying existing water quality standards or limits, dischargers must meet applicable technology-based requirements for wastewater treatment. For publicly-owned treatment works, a pretreatment program that complies with Section 403 of the Clean Water Act must be developed and implemented. If, after technology-based limits are applied, the receiving water concentrations still exceed the water quality standards, the discharges into such waters are subject to further reduction. In this case, an effluent must be characterized to determine the need for a water quality-based permit limit to control the discharge.

EPA's regulations [40 CFR 122.44(d)(1)] establish grounds for determining whether the discharge causes, has the reasonable potential to cause or contributes to an excursion of the water quality criteria. The state or discharger should identify the particular pollutants that are exceeding the water quality criteria and focus any proposed modifications on those constituents. EPA suggests that dischargers target pollution prevention activities[4] (such as waste minimization and source reduction) on those identified constituents before seeking to modify water quality standards.

EPA recognizes that, to be effective, decisions about modifications to water quality standards will require public participation. EPA also realizes that effective use of these options will require cooperative efforts by EPA, the states, the dischargers, and the public. To ensure that each of the options for modifying standards and associated water quality-based effluent limits is viable, EPA will provide assistance to states to modify uses or develop alternate criteria. When attempting to modify standards, EPA suggests that a proposal describing the intended methodology and a schedule for undertaking the study be submitted to both the state and EPA. As time allows, EPA will review and comment on proposals and offer specific recommendations. Once a state has submitted the standards modifications to EPA for consideration, EPA will take formal action and approve or disapprove the revised water quality standards.

4.1 Total Maximum Daily Load Analysis

The state or discharger should consider a Total Maximum Daily Load (TMDL) Analysis if existing criteria and uses are appropriate for that water body. The TMDL process involves the calculation of a water body's pollutant loading capacity and the allocation of allowable pollutant loads among point and nonpoint source (NPS) dischargers at levels necessary to meet applicable water quality standards. TMDLs may allow a state or discharger to show that water quality-based permit limits for particular pollutants should be modified based on the total pollutant loading capacity of a water body. TMDLs may also provide the basis for trading of pollutants among point source and nonpoint source dischargers. TMDLs may also be designed to reflect seasonal variations in water body flows.

The amount of information necessary for a TMDL analysis will depend upon the water body's water quality, hydrological characteristics and discharge conditions. EPA has developed draft guidance to assist in applying this method (Guidance for Water Quality-

[4] See the Appendix for a definition of pollution prevention

based Decisions: The TMDL Process, (EPA 440/4-91-001), April 1991). States are required to develop TMDLs for all waters that are listed on the state's Section 303(d) water body list. States must also develop a priority list for those waters [40 CFR 130.7].

4.2 Alternate Criteria

A state may propose site-specific or alternate criteria for a particular water body or stream segment. States may also develop alternate criteria for an ecoregion (e.g. a drainage area or group of ecologically similar waters) and categories of waters (e.g. desert or ephemeral streams). Alternate criteria must fully protect all designated uses (both existing and potential).

EPA has identified three procedures for developing alternate water quality criteria: the recalculation procedure; the indicator species procedure, and the resident species procedure. These procedures are described in EPA's Water Quality Standards Handbook (December 1983). EPA will consider other methodologies for developing criteria, provided they are based on sound, scientific rationale.

4.3 Use Attainability Analyses

Both the Economic Feasibility analysis and the Ecological Benefit Comparison are Use Attainability Analyses (UAA). The UAA should be considered when a designated use for a water body is unattainable. A UAA may be used only if (1) the existing uses (as defined in 40 CFR 131.3(e)) in the stream will be protected and (2) all controls required by sections 301(b) and 306 as well as reasonable and effective best management practices for nonpoint sources have been implemented for the stream segment.

The UAA process described in the federal regulations allows states to assess the feasibility of attaining the goal of "fishable-swimmable" uses in particular water bodies. The UAA, particularly for effluent-dependent streams, can demonstrate that certain uses should be modified to reflect those that are actually attainable.

The UAA process provides six factors to assist in making this demonstration. Before conducting a UAA, states must demonstrate that the use under consideration is not an existing use. An existing use is one that has been attained in the water any time since November 28, 1975. 40 CFR 131.10(g) specifies the conditions under which a designated use may be removed from a stream:

> “States may remove a designated use which is not an existing use, as defined in 131.3, or establish sub-categories of a use if the State can demonstrate that attaining the designated use is not feasible because:
> (1) Naturally occurring pollutant concentrations prevent the attainment of the use; or
> (2) Natural, ephemeral, intermittent, or low flow conditions prevent the attainment of the use, unless these conditions may be, compensated for by discharge of sufficient volume of

effluent discharges without violating state, water conservation requirements to enable uses to be met; or

(3) Human caused conditions or sources of pollution prevent the attainment of the use and cannot be remedied or would cause more environmental damage to correct than to leave in place; or

(4) Dams, diversions, or other types of hydrological modifications preclude the attainment of the use, and it is not feasible to restore the water body to its original condition or to operate the modification in a way that would result in attainment of the use;

(5) Physical conditions related to the natural features of the water body such as the lack of proper substrate, cover, flow, depth pools, riffles, and the like, unrelated to water quality, preclude attainment of aquatic life protection uses;
or

(6) Controls more stringent that those required by sections 301(b) of the Act would result in substantial and widespread economic and social impact."

EPA expects the UAA to be sufficiently detailed to support the specific standards decision in question. All UAA's must demonstrate that the use proposed for removal is not an existing use. In some cases, a letter from the applicable resource agencies and the state, with supporting data, may be sufficient to demonstrate that the use proposed for removal is not an existing use.

The level of complexity and required documentation for UAAs will depend upon the situation. For example, when attempting to establish appropriate aquatic life uses it will be relatively simple to demonstrate that certain aquatic life forms will be unable to exist in an area because of physical factors, i.e. no level of water quality will induce fish to spawn in areas where the bottom strata are not what the particular species requires for spawning. Another example of a use being limited by physical factors is swimming in a stream that only flows during storm events. Other factors such as hydrological modifications may require little documentation to demonstrate. Designating uses on a seasonal basis is often simpler than a year round de-designation. For example, aquatic criteria for fish-spawning may only be required during the autumn months.

All UAA demonstrations must allow an opportunity for public participation and must be reviewed every three years as part of a state's triennial review process to determine if any new information has become available [40 CFR 131.20].

Where appropriate, states may also consider using a variance to temporarily modify water quality standards for an individual discharger. Variances require a similar demonstration as a UAA and have typically been used to grant a time extension for a "fixable" problem. Variances may be granted on a discharger-specific basis. A variance granted to an individual discharger is often more adaptable to specific situations and EPA may be more flexible in its application. Please refer to the Preamble to the water quality standards regulation and the Water Quality Standards Handbook (Chapter One) for additional information on variances.

EPA Region 9 believes that the two UAA factors discussed in this guidance, the Economic Feasibility Analysis [40 CFR 131.10 (g)(6)] and the Ecological Benefit Comparison [40 CFR 131.10

(g)(3)] are the most appropriate methods for modifying uses for effluent-dependent waters. There may be circumstances when the variance or other UAA factors may also be appropriate.

5.0 METHOD 1: A TOTAL MAXIMUM DAILY LOAD ANALYSIS

States and dischargers should consider using the Total Maximum Daily Load (TMDL) process if a water body has appropriate uses and criteria. A TMDL estimates the pollutant loading capacity for a water body and allocates the allowable pollutant load among point source and nonpoint source (NPS) dischargers at levels necessary to achieve the applicable water quality standards. The TMDL process may provide an appropriate forum for the planning and implementation of discharge trading.

Federal regulations require states to develop TMDLs for water quality limited water bodies for which required pollution controls are not stringent enough to attain or maintain compliance with applicable state water quality standards (40 CFR 130.7). We encourage states or dischargers who are thinking about developing TMDLs for effluent-dependent streams to seek EPA's assistance. Before conducting a TMDL, states and dischargers should also consult EPA's “Guidance for Water Quality-based Decisions: The TMDL Process” (EPA 440/4-91-001, April 1991) for more information.

5.1 Calculating a Total Maximum Daily Load

TMDLs include waste load allocations for point sources, load allocations for nonpoint sources, and a margin of safety to account for uncertainty. To calculate a TMDL the following factors are considered:

- the amount of water that flows in a water body;
- the water quality standards that are established to protect uses of the water body;
- the point and nonpoint sources of pollutant discharge to the water body;
- the fate and transport of pollutants in the receiving water; and
- the variability of loadings and factors affecting assimilative capacity.

TMDL calculations are based on monitoring and modeling information and include safety factors. Depending upon the specific, water body and discharger circumstances, TMDLs may involve simple or complex modeling and monitoring efforts.

In many cases, the state or discharger may not possess detailed information on the effectiveness of NPS control strategies or the fate of pollutants in the water body. Rather than postpone development of a TMDL due to insufficient information, it may be appropriate to

consider a "phased approach". In such cases, states or dischargers establish an initial TMDL based on existing information and initiate implementation of appropriate control measures. The TMDL is

then reviewed over time to determine the effectiveness of control strategies and the potential modification of the TMDL.

5.2 Modifying Permit Discharge Limits

The TMDL process may enable a state or discharger to show that permit effluent limits should be modified. For example, a receiving water body may be capable of receiving a greater pollutant loading from a specific discharger and still meet water quality standards. Permit limits could be modified accordingly provided that the state's anti-degradation policy is not violated. However, the pollutant loading analysis may find that total loadings to a water body are greater than expected. This finding might require a new effluent limit that allows less pollutant loading rather than more.

In some cases, it may be possible for states to arrange "trades" of pollutant loading allocations among dischargers or between point source and NPS discharges. For example, a NPS discharge can sometimes be reduced with more cost-effective control measures than are available to point source dischargers. In such cases, the point source may be willing to implement NPS controls in exchange for the ability to maintain or potentially increase the pollutant allocation of its point source discharge.

Effluent-dependent streams often receive discharges from a single discharger. Trading of discharge allocations would not be appropriate in such cases. However, streams often have nonpoint source runoff that contributes to water quality impairment. In these situations, it may be appropriate for dischargers to consider implementing NPS control measures in exchange for pollutant loads from point source discharges. EPA should be consulted before initiating trading projects.

TMDLs may also be designed to reflect seasonal variations in water body flows and discharge conditions. For example, Oregon has established phosphorous TMDLs which identify different total daily loads for different water body flow conditions. This approach better addresses seasonal variations in flows and, allows a variety of permitting, NPS control, and flow management control options.

5.3 Follow-up Actions Needed

The amounts of pollution allocated for discharge by different dischargers may be changed over time as water body monitoring information improves, flow conditions change, and point and nonpoint source controls are implemented. It may be possible to revise the load and waste load allocations to reflect improved information or changes in conditions. For example, if a permitted discharger of copper ceases doing business, it may be permissible to increase the wasteload allocation for copper for another discharger without violating water quality standards. Under the anti-backsliding regulations, a new or revised TMDL is a basis for less stringent point source discharge requirements. Anti-degradation requirements must also be met.

TMDLs, particularly when using the phased approach, rely on monitoring information. Therefore, it will be necessary to consider new information and periodically review TMDLs accordingly.

6.0 METHOD 2: DEVELOPMENT OF ALTERNATIVE WATER QUALITY CRITERIA

This method enables a state to determine that water quality criteria for a specific stream segment, water body, or groups of water bodies should be different from the currently applicable criteria. Where appropriate, EPA encourages states to develop categories of waters (e.g. grouping waters by ecoregion) and develop alternative criteria for that category. Alternate criteria are appropriate where physical and/or chemical characteristics of a specific water body (or categories of waters) alter the toxic effects of certain pollutants or where the species present in the water body are more or less sensitive than, the species used in developing the current criteria.

Recalculating the criteria to reflect local species is one acceptable method for effluent-dependent streams. First, states or dischargers should develop a comprehensive list of the species that are historically and currently present in the water(s). It will be important that the species list indicates the most sensitive species present in the water(s). Next, the species list is compared to those species used in calculating the current criteria. If the species listed have a different level of sensitivity than those used to develop the current criteria, the criteria can be recalculated.

Another option is to use the indicator species procedure which revises the criteria based on physical or chemical characteristics of the water body. This procedure involves laboratory toxicity testing to develop a water-effects ratio, is highly technical, and requires rigorous attention to laboratory protocol and scientific methodology.

Finally, the resident species method may be used to revise the criteria to account for differences due to species sensitivity and physical or chemical characteristics of the water body. This method involves laboratory toxicity testing for resident species.

Developing alternate criteria requires a scientific demonstration that the revised criteria are sufficient to fully protect the designated uses. EPA's three procedures for developing alternate water quality criteria are described in Chapter 4 of EPA's Water Quality Standards Handbook (December 1983). If other methodologies are developed, we recommend that EPA be consulted to ensure that the methodologies meet Clean Water Act requirements and are based on sound, scientific methodology.

7.0 METHOD 3: DEMONSTRATE THAT A DISCHARGE YIELDS NET ECOLOGICAL BENEFITS

The Ecological Benefit Comparison is a Use Attainability Analysis (UAA). 40 CFR 131.10(g)(3) invokes a concept of net ecological benefit: "human caused conditions or sources of pollution prevent the attainment of the use and cannot be remedied or would cause more environmental damage to correct than to leave in place." If removal of a human caused condition (the discharge to an effluent-dependent water body) would cause more environmental damage than would exist if the condition remained, the regulations allow application of this UAA method.

The process enables dischargers to demonstrate that use designations should be modified in specific situations where the value of providing or enhancing riparian habitats outweighs the benefit of attaining specified potential uses. Modifying the use designations may result in lower treatment costs for dischargers. However, the Ecological Benefit Comparison is based on a comparison of the relative ecological benefits or values of retaining or diverting an effluent discharge; it is not an evaluation of the economic impacts of treatment nor is it a cost-benefit analysis.

7.1 When to Use the Ecological Benefit Comparison

A UAA may be applied only if existing uses of the stream will be protected and if all controls required by sections 301 (b) and 306 as well as reasonable and effective best management practices for nonpoint sources have been implemented for the stream segment.

States and dischargers should consider this method if an existing discharge supports or enhances an ecologically valuable riparian or aquatic habitat. This method enables dischargers to show that the ecological benefits of continuing an effluent discharge exceed the ecological benefits of removing the discharge from the water body. Effluent-dependent waters may provide net environmental benefits even though all designated uses can not be attained.

The Ecological Benefit Comparison may also be applied to new discharges. However, demonstrating a net ecological benefit that results from a new discharge is often more difficult because the expected benefits can only be estimated. Additionally, it will be necessary to offer supporting information that the proposed habitat is ecologically preferable to the stream conditions and habitat values associated with an otherwise ephemeral or intermittent stream. For example, the analysis should evaluate the effect on native organisms that are adapted to intermittent and ephemeral flows.

Most of the discussion below focuses on an Ecological Benefit Comparison for existing discharges. However, much of the information is also applicable to new discharges.

Examples of possible ecological benefits include:

- restoration, expansion, or enhancement of aquatic and riparian habitat for native species - particularly those habitats that support threatened/endangered or candidate species or migratory waterfowl;
- enhancement of species diversity;
- enhancement of the quality, growth or extent of native riparian vegetation;
- preservation of existing riparian or aquatic habitat that could not be maintained in its present condition without the discharge of effluent;
- improvement in water chemistry for parameters which are important to ecosystem development and preservation, such as dissolved oxygen levels.

EPA generally expects a positive demonstration of the following conditions in order to approve a UAA based on a net ecological benefit:

1. The water body is in a primarily arid area such that aquatic resources are limited and ecologically valuable. The water body supports an ecologically desirable aquatic, wetland, or riparian ecosystem and supports native plant species and wildlife. For new discharges, the water body must have the potential to support such ecosystems.

2. Effluent discharges do not produce or contribute to concentrations of pollutants in tissues of aquatic organisms or wildlife that are likely to be harmful to humans or wildlife through food chain concentration.

3. The discharger documents that a feasible plan to remove the discharge is under consideration.

4. The analysis demonstrates that a continued discharge to the water body has not created and is not likely to cause or contribute to violations of downstream water quality standards or groundwater basins[5].
5. All practicable pollution prevention programs, such as pretreatment and source reduction, are in operation. The discharger verifies that it has responded appropriately to previous and on-going compliance actions.

6. In order to preserve the net ecological benefits associated with the discharge, it is recommended that the discharger commit to providing effluent to the stream that is sufficient to protect and maintain the ecological benefit as determined by EPA, and state and federal wildlife agencies.

7.2 How to Demonstrate an Ecological Benefit Comparison

Before undertaking an Ecological Benefit Comparison, we encourage states or dischargers to consult with EPA. We also encourage parties who are thinking about applying this method to seek EPA's assistance in developing study plans and to consult with EPA and resource agencies throughout the analytical process. EPA is committed to assisting states and dischargers in developing adequate study plans to support Ecological Benefit Comparisons.

The basic approach in an ecological benefit comparison is to compare the ecological values of a stream without effluent to the ecological values of a stream with effluent discharge. The specific information required for an Ecological Benefit Comparison will vary according to the potential ecological benefit. The following elements should be addressed in demonstrating net ecological benefits:

[5]Monitoring data showing compliance with downstream standards should be a sufficient demonstration of this.

1. Describe existing aquatic life and human health uses of the water body and demonstrate that these uses are protected.

   Describe the designated human uses of the effluent-dependent water(s) and demonstrate that existing human uses (e.g. body contact, fish consumption, drinking water, etc.) are fully protected.

   Describe the existing aquatic life uses of the effluent-dependent water and demonstrate that these uses are fully protected.

2. Characterize present and anticipated pollutant concentrations and loadings to the effluent-dependent water(s) and associated effects.

   Assess the ecological and human health risks associated with proposed or anticipated pollutant loadings and the possible acute toxicity and chronic toxicity effects.

   Assess ecological and human health risks associated with possible bioaccumulation of toxic contaminants.

   Assess the downstream impacts of the pollutant loadings and consider the additive effect of similar discharges to downstream water bodies and their tributaries.

3. Characterize instream and riparian ecological values associated with a water body in both its ephemeral or intermittent condition and its effluent-dependent condition.

   States or dischargers should discuss what would happen if the discharge were diverted and what would be the effect on the existing habitat. Particular attention should be paid to the effects on threatened, endangered or candidate species. For new discharges, expected ecological benefits and impacts of the proposed discharge should be described.

   Demonstration of an ecological benefit should be specific and tangible. States or dischargers should be as precise as possible about the proposed ecological benefit, i.e. how much of increased riparian vegetation (in acreage) is expected through the discharge, how will the proposed effluent increase the diversity of plant or wildlife, how is the effluent expected to increase the population size or affect the mortality/life cycle of endangered species. Where appropriate, EPA encourages vegetation planting, restoration of channel morphology or other enhancement efforts to provide an ecological benefit.

   In describing the ecological benefit, the state or discharger should discuss the overall strategy for creating, managing, and preserving the habitat. A monitoring plan should be developed which can document that the ecological benefit is maintained. A plan should be developed for new discharges describing how the ecological benefit will be achieved over time and how the projected benefits will be monitored to verify that the benefits are achieved. Specific milestones and tasks should be identified and

may be placed into the discharger's permit.

EPA encourages net ecological benefits that offer a comprehensive and coordinated approach to entire drainage basins. In particular, special consideration will be given to watersheds where various parties with a stake in specific local situations are cooperating and where the ecological benefit is part of a full range of methods and efforts for developing an integrated strategy for a geographic area.

To demonstrate an ecological benefit for new discharges, special consideration should be given to the value of preserving existing habitats and wildlife associated with naturally intermittent or ephemeral streams and whether the effluent-dependent stream would be more desirable than the existing stream habitat.

This method requires qualitative comparisons among different kinds of ecological attributes and, therefore, EPA expects states or dischargers to work with resource management agencies such as US. Fish and Wildlife Service and its counterpart state agencies to structure and interpret an Ecological Benefit Comparison.

EPA is preparing additional guidance to assist in the demonstration of the ecological benefits associated with effluent-dependent streams. EPA will rely heavily upon the professional judgment of aquatic and riparian resource experts in our evaluations. As the Ecological Benefit Comparison may affect local water resources, an opportunity for extensive public comment is required. EPA will take public opinion into account when reviewing an Ecological Benefit Comparison. In all cases, the determination of a net ecological benefit will be made on a case-by-case basis and will require the application of good judgment.

7.3 Follow-up Actions Needed

If the analysis demonstrates that a discharge yields net ecological benefits, it will be appropriate for the state to modify the designated uses of a water body to reflect those that are attainable and revise its water quality criteria to protect the modified uses. In establishing appropriate modified uses, the state should consider the highest level of water quality that can be achieved through reasonable and economically feasible improvements in water pollution control such as pollution prevention efforts (including pretreatment, waste minimization, and source reduction). This water quality should be reflected in the new designated uses for the water body and the criteria should be revised. The UAA is reviewed every three years as part of a state's triennial review process.

The modifications to the potential use(s) should be, specific and, where possible, should be expressed as a subcategory or subclassification of the use. For example, if the UAA demonstrates that meeting water quality standards for copper is unattainable, then the use designation would be revised to exclude only those aquatic life species that would not be present in a copper-impaired water body.

EPA strongly encourages the use of pollution prevention as a follow-up to the Ecological UAA. EPA will also consider the level of water quality that is necessary to protect the proposed ecological benefit. Where appropriate, stream or riparian enhancement efforts such as channel modifications or native seed planting may be performed to enhance the net ecological benefit. Finally, the monitoring requirements identified in the net ecological benefit demonstration must be met.

8.0 METHOD 4: DEMONSTRATE THAT IT IS ECONOMICALLY INFEASIBLE TO ATTAIN DESIGNATED USES

The Economic Feasibility method considers the economic and social impacts associated with the cost of effluent treatment needed to attain a designated use. States and dischargers should consider applying, this method when they believe they have sufficient information to demonstrate that attaining the designated uses will cause "widespread and substantial social and economic impact" to the defined community [40 CFR 131.10(g)(6)]. A UAA may be applied only if existing uses of the stream will be protected and if all controls required by sections 301(b) and 306 as well as reasonable and effective best management practices for nonpoint sources have been implemented for the stream segment.

To conduct an Economic Feasibility analysis, states or dischargers should first identify all reasonable technological options for meeting applicable standards for the water body in question. Dischargers should consider a broad range of possible discharge management options including pollution prevention methods. Pretreatment and source reduction programs are often more cost-effective than end-of-pipe treatment in improving discharge quality. EPA prefers pollution prevention to costly end-of-pipe treatments such as reverse osmosis as a way of meeting water quality standards.

Next, the economic and social impacts associated with each effluent management option should be estimated. The analysis should describe how the treatment costs necessary to protect the designated uses would be borne by the discharger and how those costs would be distributed to the surrounding community. Particular attention should also be given to describing the socio-economic health of the affected community including the employment, level and the mean household income. The analysis should also estimate impacts to the community of not meeting the applicable water quality standard.

EPA has developed guidance for assessing economic impacts associated with POTW upgrades[6]. This guidance includes procedures and interpretations for assessing affordability and community impacts. For example, if installation of treatment technology would require a utility to levy a user charge greater than a certain percentage of mean, annual household income in the service area; the economic impact might be considered widespread and substantial. The economic impact analysis could take into account the total amount of taxpayer-supported debt of the service provider and other public utilities in the service area.

[6] See EPA's Financial Capability Guidebook, March 1984; available from Region 9.

EPA Region 9 is currently developing additional guidance to assist in the evaluation of economic impacts for effluent-dependent streams[7]. In all cases, determination of widespread and substantial impact will be made on a case-by-case basis and, therefore, requires the application of good judgment. The state must provide opportunity for public comment when proposing to remove or modify a use. EPA will, consider public comments when evaluating the Economic Feasibility UAA.

8.1 Economic Benefits of Water Reclamation

It may be appropriate to factor water reclamation benefits into the analysis if effluent treatment costs associated with a water reclamation project would be prohibitively expensive. The social and economic value of distributing scarce water resources between new and, existing water demands should be thoroughly examined at the local and/or state level. The state should estimate the non-ecological social and economic benefits of the project.

An example of a benefit to include is a reclamation project that provides process water for an existing manufacturing facility and enables a community to reduce its purchases of potable water supplies, some of which were formerly used in the industrial process. If the project would not be completed because of the costs of complying with water quality-based effluent limits, then these economic benefits would be lost. Therefore, estimating the reclamation benefits forgone (e.g., the continued need to purchase industrial process water) is one method of estimating the costs of attaining a designated use. After incorporating water reclamation benefits forgone into the economic analysis, the same test would have to be met: that attaining the designated uses would cause substantial and widespread social and economic impacts.

The regulations do not permit states to establish waste transport as a designated use of a water body [40 CFR 131.10(a)]. However, a discharge for a purpose, such as downstream reclamation, may be allowed in some situations if applicable water quality standards are not exceeded.

8.2 Follow-up Actions Needed

If the UAA demonstrates that attainment of designated uses would result in substantial and widespread social and economic impact, then the state may modify uses of the water body to reflect the attainable uses. In establishing appropriate modified uses, the state should consider the highest level of water quality that can be achieved through reasonable and economically feasible improvements in water pollution control without causing widespread social and economic impact. This water quality should be reflected in the new designated uses for the water body and the criteria should be revised. The UAA is reviewed every three years as part of a state's triennial review process.

[7] This technical document will be available September 1992.

The modifications to the potential use should be specific and, where possible, should be expressed as a subcategory or sub classification of the use. For example, if the UAA demonstrates that meeting water quality standards for copper is unattainable, then the use designation would be revised to exclude only those aquatic life species that would not be present in a copper-impaired water body.

EPA strongly encourages the reduction of toxic loadings through the use of pollution prevention efforts such as pretreatment, waste minimization, and source reduction as follow-up steps to a Use Attainability Analysis.

9.0 OBTAINING TIME NEEDED TO PERFORM NECESSARY STUDIES

If a state intends to modify water quality standards, EPA suggests that the necessary analyses begin as soon as possible and should not be delayed until permit reissuance. However, EPA Region 9 recognizes that the methods discussed in this guidance may be time-consuming to apply. Where appropriate, EPA intends to be flexible in allowing states and dischargers the necessary time to conduct the studies needed for UAAs, alternate standards, TMDLs, and pollution prevention alternatives through appropriate compliance schedules and variances.

Before granting additional time to conduct studies, the following conditions should be met:

- the point source discharge(s) are meeting applicable technology-based permit limits;
- the additional. time required to conduct studies does not conflict with the state's implementation plan;
- an initial analysis shows that applicable standards are not being attained;
- one of the methods described in this guidance is appropriate to the discharger's situation; and;
- appropriate workplans have been developed to determine Whether standards are inappropriate or unattainable.

In each case where these approaches are used, interim effluent limits should be established that protect existing water uses and corresponding water quality. Where appropriate, such interim limits may be based on ambient water quality. Below is a discussion of the various options available to states and dischargers for obtaining time to perform necessary water quality studies.

9.1 Compliance Schedules in Permits and Enforcement Orders

States have the option of developing implementation plans as part of their state water quality plan. Such implementation plans may allow compliance schedules to give permittees time to conduct water quality studies and implement pollution control measures. Compliance schedules may be included in NPDES permit conditions as long as these schedules are consistent with the water quality standards. Permits which include compliance schedules should also include interim limits, and a series of actions or evaluations, including completion dates, that the permittees are required to follow. Development of alternate standards, UAAs and TMDLs are tasks that may be required in compliance schedules. Implementation of pollution prevention methods, such as pretreatment and source reduction programs may also be required in a compliance schedule. When issuing a compliance schedule, states should determine what is the shortest practicable time frame for the completion of the tasks.

Compliance schedules may also be included in enforcement orders. Such schedules may allow greater flexibility for the issuer than compliance schedules in permits.

9.2 Variances

Another option is to issue variances for individual dischargers. As discussed above in Section 4.3, variances are standards modifications that generally cannot be granted unless the applicant can demonstrate that a UAA would be likely to support modification of designated uses.

10.0 HOW THIS GUIDANCE RELATES TO OTHER REGULATIONS

Nothing in the guidance is meant to conflict with the goals, purpose or requirements of the Clean Water Act and its implementing regulations or Agency policy.

When modifying water quality standards and effluent limits using this guidance, states and dischargers must also consider applicable anti-backsliding and anti-degradation requirements. We suggest that states and dischargers consult with EPA regarding how the modifications of water quality standards and effluent limits discussed in this guidance relate to anti-degradation and anti-backsliding requirements. For anti-degradation questions, states and dischargers should also consult federal regulations [40 CFR 131.12] and EPA's Water Quality Standards Handbook. For anti-backsliding questions, states and dischargers should consult the Clean Water Act [Section 1342 (o)], federal regulations [40 CFR 122] and EPA's Draft Interim Guidance on Implementation of Anti-backsliding Rules for Water Quality-Based Permits.

Decisions about anti-backsliding and anti-degradation issues must be made on a case-by-case basis. However, in order to provide some direction to states and dischargers on how this guidance relates to anti-backsliding and anti-degradation requirements, a very general and broad description of the requirements is provided below:

1. **Use Attainability Analysis**: A UAA will typically include much of the demonstration required for an anti-degradation analysis. Depending upon how the revised water quality standards translate into new permit limits, an anti-backsliding analysis may be required.

2. **Development of Alternate Criteria:** By developing alternate criteria, states are providing a scientific demonstration that the revised criteria are sufficient to fully protect the designated uses. Whether the state must also conduct an anti-degradation analysis depends upon whether the water body is a high quality water or has been identified by the state as an outstanding national resource. Depending upon how the revised water quality standards translate into new permit limits, an anti-backsliding analysis may be required.

3. **Total Maximum Daily Load:** In developing a TMDL, an anti-degradation analysis is typically not required because uses and criteria are not modified. Permit modifications may require an anti-backsliding analysis. A new or revised TMDL is an allowable basis for backsliding.

11.0 CONCLUSION

EPA Region 9 is committed to working with regulatory agencies, impacted dischargers, and the public to resolve the issues concerning effluent-dependent streams in the arid West. We recognize that it may be necessary to modify water quality criteria, uses, and their water quality-based permits to accurately reflect the conditions in the arid West. Case-by-case decisions about water resources and conditions are highly complex and EPA requires and emphasizes the need for public participation and discussion when making these decisions. This guidance offers a possible framework for striking a balance between protection of designated uses, preservation of valuable ecosystems, and the benefits of water reclamation.

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This guidance does not establish or affect legal rights or obligations. It does not establish a binding norm and is not finally determinative of the issues addressed. Agency decisions in any particular case will be made applying the law and regulations on the basis of specific facts and actual action.

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APPENDIX

Following are definitions of key terms used in this document which will help EPA and states to discuss this guidance:

Effluent-dependent waters: For purposes of this guidance, EDWs shall mean and include any effluent dependent waters as defined by state law and identified by state water quality regulations. In considering EDWs under the net ecological benefit provision, it will be important to demonstrate that the health of the aquatic and/or riparian habitats are dependent upon the effluent.

Pollution Prevention: While the exact definition of pollution prevention is still evolving, Region 9 suggests that the pollution prevention definition contain the following four components:

Source Reduction - process modification, input feedstock substitution, reformulations;

Waste Minimization - reduction in the quantities and toxicity of wastes generated, improved materials management and housekeeping;

Recycling - onsite reclamation and reuse, offsite recovery, markets for recycled materials; and

Prevention-based Behavior - consumer education, label validation and certification, water conservation, and energy efficiency.

Water reclamation: For purposes of this guidance, water reclamation refers to the reuse of domestic wastewater that has been treated so that it is suitable for a direct out-of-stream use that would not otherwise occur. Reclaimed water may be used for irrigation, groundwater recharge, industrial process, or other purposes. Although reclamation projects typically divert treated wastewater to out-of-stream uses, many such projects require some discharge to waters of the United States.