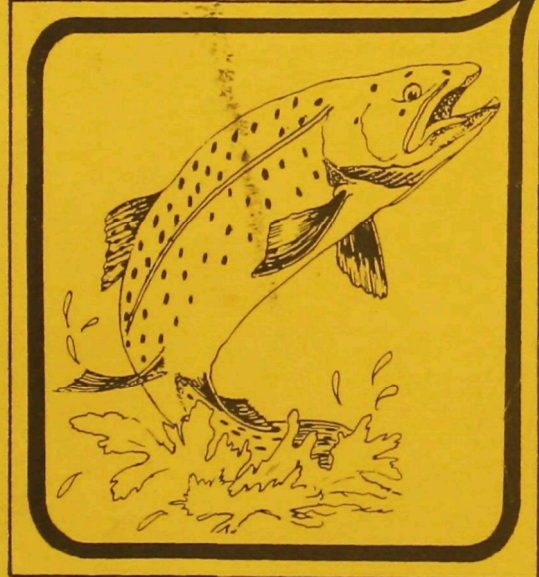


**GUIDELINES FOR STATE AND
AREAWIDE WATER QUALITY
MANAGEMENT PROGRAM
DEVELOPMENT**

**CHAPTER 5
WATER QUALITY STANDARDS**



U.S. ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460
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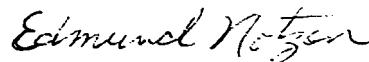
FOREWORD

Chapter 5 - Water Quality Standards is part of "Guidelines for State and Areawide Water Quality Management Program Development" which can be obtained upon request from this office. This document was available for interim use and public review and comment in November 1976. The Guidelines are intended to be used by State and areawide agencies in developing implementable water quality management programs consistent with Environmental Protection Agency regulations 40 CFR Parts 130 and 131. These regulations deal with the State continuing planning process policies (40 CFR 130) and the preparation of State and areawide water quality management plans (40 CFR 131). In particular, 40 CFR 130.17 sets forth the water quality standards policy, including anti-degradation, which Chapter 5 addresses.

Due to the significant degree of interest in the water quality standards policy and the ongoing activities to review and revise standards, this office is republishing Chapter 5 of that document. For further information on the planning process and the relationship of standards to that process, please refer to other Chapters of the Guidelines. Requests for copies of Chapter 5 or the entire document should be addressed to:

Environmental Protection Agency
401 M Street, S. W.
Washington, D. C. 20460
ATTN: Water Planning Division (WH-554)

Comments on these Guidelines are requested and should also be addressed to this office. The Guidelines will be revised on the basis of comments received and issued as final in the Spring of 1977.



Edmund Notzon
Acting Director
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CHAPTER 5

WATER QUALITY STANDARDS

5.1 Introduction

Water quality standards are an essential part of the State water quality management (WQM) system. The standards:

- . Publicly define the State's water quality objectives, and hence form the basis for its planning;
- . Serve as the basis for determining National Pollution Discharge Elimination System (NPDES) permit effluent limitations for pollutants which are not specifically addressed in the effluent guidelines or for pollutants for which the effluent guidelines are not stringent enough to protect desired uses;
- . Serve as a basis for evaluating and modifying Best Management Practices (BMP) for control of nonpoint sources;
- . Serve as a basis for judgment in other water quality related programs, including water storage for regulation of stream flow, water quality inventories, control of toxic substances, thermal discharges, cooling lakes, aquaculture, and dredged and fill activities.
- . Contain the State's antidegradation policy.

A. Purpose and Applicability

The purposes of water quality standards are set forth in Section 303 of the Act and in 40 CFR Part 130. Standards must be reviewed and revised where appropriate at least once every three years to assure that the standards are consistent with the Act and regulations.

Water quality standards must apply to all surface water of the United States, including the territorial seas. In addition, they must be applicable to all sources of pollutants. Provisions in the standards which directly or indirectly exempt any class of sources, such as nonpoint sources, are not allowable. These guidelines, however, provide for methods to deal with exceptional situations (e.g. extreme high or low flow conditions).

EPA strongly supports the establishment of water quality standards which will support the protection and propagation of fish, shellfish and wildlife and recreation in and on the water. In furtherance of this objective, EPA believes that water quality standards should be established at levels consistent with the national water quality goal of section 101(a)(2) of the Act for every stream segment wherever those levels are attainable.

B. Scope of State Review and Revision of Water Quality Standards

Portions of existing water quality standards may be adequate and may require no revision. Hence, the State will only have to concentrate on those standards that are inadequate. Revisions most probably will be needed in three key areas:

1. Uses--must be upgraded wherever 1983 national water quality goal uses are not designated and higher uses are attainable;
2. Criteria--new criteria should be added and existing criteria modified as necessary to support the use, particularly in the area of toxic pollutants; and
3. Antidegradation--revision of antidegradation policies is likely to be required.

In addition, in its review and revision process, the State must assure that its water quality standards provide for the attainment of the water quality standards of downstream water (§130.17(c)(4)).

C. General Content of State Water Quality Standards

A centralized State water quality standards document must contain at a minimum, the following components:

1. Certification that the standards are included within State law;
2. Statement of general policy consistent with 40 CFR §130.17;
3. Statement of applicability of water quality standards, including the State's mixing zone policy;
4. Definitions;
5. A listing of the use designations for all the waters of the State, including any site specific water quality criteria for specific segments.

6. Water quality criteria that define the conditions necessary to maintain the beneficial water use designations;
7. An antidegradation statement;
8. Specifications of statistical requirements and reference to analytical testing and sampling procedures to determine if standards are being met; and
9. A listing of outstanding national resource waters.

In addition, it is recommended that the standards document contain maps delineating stream segments which can be clearly referenced to the stream use designation list.

Where water quality standards are developed Statewide they must be incorporated by reference into the individual State WQM plans.

Where water quality standards are developed for a planning area through the State WQM process, any or all of the above components can be incorporated by reference in the centralized State water quality standards document. Identification of the State WQM plan that contains the standards and the date of adoption and EPA approval of the water quality standards contained within the plan must be included.

D. Relationship to the State WQM Process

The State WQM process must contain mechanisms, including public participation, to conduct water quality standards reviews and revisions. By conducting standards reviews as a part of the State WQM process, States can assure that standards are an essential component of the overall State water quality planning and management program. The State WQM process may itself result in recommending revisions to water quality standards.

Water quality standards, once approved or promulgated, are to be included as an element of the State WQM plan (§131.11(e)) and are to be implemented through the State's WQM process. Water quality standards play a key role in the State WQM process by setting the goals for plan development and implementation and providing information necessary to complete other outputs of the State WQM program. In turn, the State WQM process is the vehicle for "coordinating actions leading to water quality standards implementation. All aspects of the process are directed to achievement of standards.

The NPDES permits issued pursuant to Section 402 of the Act and nonpoint source regulatory program controls (BMP) implemented pursuant to Sections 208, 303(e) and 313 of the Act must be consistent with the State WQM process. Together, point and nonpoint source controls must result in the achievement and maintenance of water quality standards.

If a violation of water quality standards can be shown to be attributable to pollution from a particular point source or group of sources then effluent limitations must be imposed. (§301(b)(1)(C) of the Act.)

As no uniform or national BMP for nonpoint sources is mandated under the Act, the level of BMP control may differ from area to area. Water quality standards will serve as a basis for evaluating and modifying BMP's for control of nonpoint sources. If water quality standards violations attributable to nonpoint sources continue after BMP's are implemented, the BMP's must be modified where practicable to control specifically those pollutants responsible for the violations.

In some cases, even the reconsidered BMP's may not be sufficient to stop the nonpoint source related water quality standards violations. These violations may be continuous or rainfall related. If the 1983 goal uses and associated criteria are not being achieved, and cannot be achieved through application of modified BMP's, then limited spatial and temporal exceptions can be granted under certain conditions (see the discussion on irretrievable man-induced conditions on p. 5-7 and mixing zones on p. 5-16). All exceptions must be reexamined every three years during the water quality standards reviews to determine if new nonpoint source control technologies or strategies that have been developed can restore the excepted waters.

5.2 Water Uses

A. Use Designation and Regulatory Requirements

The regulations (§130.17(c)(2)-(3)) provide the following:

"(2) The State shall maintain those water uses which are currently being attained. Where existing water quality standards specify designated water uses less than those which are presently being achieved, the State shall upgrade its standards to reflect the uses actually being attained.

"(3) At a minimum, the State shall maintain those water uses which are currently designated in water quality standards, effective as of the date of these regulations or as

subsequently modified in accordance with §130.17(c)(1) and (2). The State may establish less restrictive uses than those contained in existing water quality standards, however, only where the State can demonstrate that:

- (i) The existing designated use is not attainable because of natural background;
- (ii) The existing designated use is not attainable because of irretrievable man-induced conditions; or
- (iii) Application of effluent limitations for existing sources more stringent than those required pursuant to Section 301(b)(2)(A) and (B) of the Act in order to attain the existing designated use would result in substantial and widespread adverse economic and social impact."

The States must review their water quality standards and revise them as appropriate. The review must include standards for all waters and revisions must be consistent with the following:

1. Public health must be protected for all waters;
2. The national water quality goal uses of protection and propagation of fish, shellfish and wildlife and recreation in and on the water must be designated in the standards for all waters, wherever attainable, including those segments where they are not currently being attained instream. (The meaning of the term "attainable" is discussed under Ch. 5.2(C)--Exceptions to Designating National Goal Water Uses.)
3. Where current water quality conditions support a higher use than that for which a segment is presently classified, standards for that segment must be upgraded to include the higher use; and
4. Water quality standards must provide for the attainment of the water quality standards assigned to downstream waters.

In some cases it may be appropriate to provide for seasonal use designations where uses are not attainable on a year round basis. For example, intermittent streams that are dry in the summer might qualify for seasonal designations. However, seasonal uses are not appropriate where the effects of the discharge of pollutants might preclude uses in other seasons.

B. Maintenance of Existing Uses

Each beneficial water use which is currently being achieved must be included in the use designations (S130.17(c)(2)). There are no provisions for exceptions to this requirement. Beneficial uses include such uses as protection and propagation of aquatic life, recreation in and on the water, public water supplies, agricultural and industrial water supplies, and navigational uses. Waste assimilation and waste transport* are not approvable use designations. The State's antidegradation policy and procedures must assure maintenance of existing uses.

C. Exceptions to Designating National Goal Water Uses

Where a national water quality goal use, as specified by Section 101(a)(2) of the Act, is determined to be unattainable, the exception should be confined to a carefully limited geographic area. The lowered use in that area must not result in the loss of an existing or potential use elsewhere. In most cases, the unattainability of the use should be permitted to occur only in the near term, and specific criteria should be adopted which will lead in the direction of early future designation of the use. Where primary water contact recreation is not attainable, but secondary contact recreation is attainable, the latter use should be designated.

Exceptions must be reviewed as part of the three year water quality standards review and removed if the previously designated uses become attainable. National water quality goal uses must then be designated.

The Regional Administrator has authority to approve any proposed State water quality standards. He is also responsible for reviewing existing and proposed standards which do not include designated uses consistent with the national water quality goal. The Regional Administrator, where appropriate, will request additional information from the State to evaluate the basis for establishing uses at levels less stringent than the national water quality goal.

The following guidance provides direction on EPA policy for considering lesser uses than those associated with the national water quality goal.

1. Determinations for Upgrading Existing Designated Uses

Waters that are currently designated for uses which require water quality lower than that necessary to maintain the national water quality goal uses must be upgraded wherever attainable. The State should take into account environmental, technological

social, economic and institutional factors, but it must upgrade standards in the following circumstances:

- a. Where existing standards specify uses lower than those actually being achieved instream;
- b. Where existing water quality will improve as a result of current technology-based control measures (BATEA and BPWTT) being applied, and a higher use can be anticipated; and
- c. Where existing water quality standards specify uses or criteria that will not provide protection for uses presently achieved or to be achieved in downstream waters.

2. Determinations for Downgrading Existing Designated Uses

Waters that are currently designated for national water quality goal uses may not be downgraded unless the State can demonstrate in writing that one of the conditions set forth below exist (§130.17(c)(3)). Any downgradings must also be consistent with the antidegradation policy (Section 5.4). Any downgrading is subject to the approval of the Regional Administrator.

- a. The use cannot be attained because of natural background conditions

This basis for an exception should have limited application. It should be recognized that most water bodies have some communities of fish, shellfish and wildlife. However, examples of natural background conditions which may preclude the aquatic life use include streams with leachate from natural heavy metal deposits and streams with natural ephemeral, intermittent or low flow conditions.

- b. The use cannot be attained because of irretrievable man-induced conditions

Man has changed his environment from that which occurred historically. This basis for an exception applies only to irretrievable losses of national water quality goal uses that have occurred in the past.

The term "irretrievable" in the context of these guidelines means that the past loss of a national water quality goal use, due to man's modification of his environment, is considered permanent or incapable of being restored or regained.

Three primary situations may qualify a specific segment for an exception:

(1) Where the national water quality goal use is not being achieved due to nonpoint source pollution that cannot be abated with application of BMP's or BMP's modified to meet water quality standards and the activity or change in land use is determined by the affected public to be essential.

(2) Where the national water quality goal use is not being achieved due to hydrological modifications that cannot be removed or operated in such a manner as to restore the use.

(3) Where the national water quality goal use is not being achieved due to deposition of instream toxicants due to man's past point or nonpoint source activities and such deposits are not capable of being removed by natural processes over an appropriate planning period (usually 20 years) and are not capable of being removed by man without a severe long-term environmental impact.

This basis for an exception must not be used to waive water quality requirements with respect to individual point or nonpoint sources where control methods or reasonable alternative control strategies are available. It is important to remember that natural processes may require many years to undo the damage that man has caused. Since the water quality standards uses and criteria provide a legal mechanism for imposition of controls, downgrading national water quality goal uses may allow continued abuse and natural recovery will be precluded.

c. The use cannot be attained because the imposition of controls above or in addition to the technology-based requirements of BATEA* and BPWTT** would be required and would result in a substantial and widespread adverse economic and social impact

The Regional Administrator will carefully review the State's determination of what constitutes a substantial and widespread impact and warrants an exemption from designating

*Best Available Technology Economically Achievable (§301(b)(2)(A))

**Best Practicable Wastewater Treatment Technology (§301(b)(2)(B))

the use. However, at a minimum, all three of the following situations must be present:

(1) Imposition of controls above or in addition to BATEA and BPWTT would be required even though BMP's will be implemented;

(2) The adverse economic and social impacts resulting specifically from imposition of the controls, and reflected in primary and secondary unemployment impacts, plant closures, changes in governmental fiscal base, and other area economic indicators, are substantial and widespread in comparison to other economic factors affecting the area's economy, to national economic conditions and fluctuations, and can be expected to persist for periods longer than provided for by adjustment payments such as unemployment compensation; and they are detectable in an area appropriate for measurement, at least as large as a county or SMSA and, if appropriate, any larger economic areas such as defined by the Bureau of Economic Analysis, U.S. Department of Commerce. In making a determination of substantial impact, the positive economic and social impact of enhanced water quality must be evaluated.

5.3 Water Quality Criteria

State water quality standards must contain water quality criteria which define the conditions necessary to maintain and protect the designated water uses. Narrative and numerical criteria should be adopted that will provide the best management basis for control of water pollution and maintenance of high quality waters. Numerical criteria are preferred because they are more easily interpreted in defining specific control requirements, but narrative criteria are useful also.

When a water use classification is changed, corresponding criteria changes must also be made. Where waters are designated for multiple uses, the standards must provide that the most stringent criterion for each parameter will be applicable. Even when an existing use classification is acceptable, criteria may require revision in the light of new knowledge concerning human health and aquatic life needs. Changes may also be required in response to specific determinations made pursuant to Section 316(a) of the Act.

In keeping with established EPA policy:

- . Numerical criteria should be stated wherever possible;
- . Biological or bioassay criteria should be employed where numerical values are not practicable provided that the criteria are described with enough detail to be implementable. Bioassay criteria, for example, should specify those species to be used in particular waters and guidance should be given on how to use the results to draft permit conditions or modify BMP's; and
- . Narrative criteria should be employed where other values cannot be established or to supplement numerical values. Narrative criteria should include detail sufficient to show clearly the quality of the water intended, so that NPDES permit conditions and nonpoint source control requirements (BMP's) can be developed or modified based on the criteria.

Seasonal uses and criteria should be adopted wherever necessary and appropriate. For example, where waters are used for propagation by certain species only during certain periods of the year and such species propagation requires higher levels of dissolved oxygen and/or lower temperatures than otherwise necessary to protect the species, the adopted criteria should include such higher dissolved oxygen levels and/or lower temperatures for the periods when they are needed. Another example might be an intermittent stream during periods when no water is present in the stream bed. In this case special criteria or use designations may be appropriate.

For any segment which provides habitat for any threatened or endangered species identified pursuant to the Endangered Species Act (P. L. 93-205), water quality standards must be adopted which will protect such species and preclude the destruction or modification of the critical habitat of those species identified as critical. Water quality standards must also describe the water quality necessary to assure the protection and propagation of protected species described pursuant to the Marine Mammal Protection Act (P. L. 92-522), the Migratory Bird Conservation Act (P. L. 70-257), and the Migratory Bird Treaty Act (16 U.S.C. 701-711).

A. Numerical Water Quality Criteria

The Administrator's Quality Criteria for Water document published under Section 304(a) of the Act will represent normally

acceptable levels of water quality to support the related use. While the Section 304(a) document will serve as the basic reference, other publications that define water quality criteria may also be applicable.

Specific numerical criteria generally should be adopted for those parameters which represent serious existing or potential water quality problems in the State. The adoption of numerical values for toxic substances is particularly important, to insure protection of the highest uses and to provide a water quality basis for control for these substances. Site specific circumstances may permit less restrictive criteria or require stricter limits for specific parameters than those contained in the Section 304(a) document. Establishment of a numerical value for a criterion at a less stringent level than that recommended in the Section 304(a) document should be accompanied by an adequate technical justification to the Regional Administrator. Pursuant to the authority contained in Section 510 of the Act, States may, of course, adopt more stringent water quality criteria or water uses than that recommended by EPA.

The Administrator will periodically modify or add to the criteria developed under Section 304(a). Such changes should be considered for adoption by the States during their next regularly scheduled standards review following the change.

For numerical criteria, the statistical requirements for data interpretation and sampling must be stated, for purposes of applying and enforcing standards. Mean and maximum concentrations should be stated where appropriate. The time, place, method and duration of sampling should be identified or referenced as a part of the water quality standards to assure comparable results. In general, sampling locations and times should be based on critical conditions or alternatively should attempt to characterize the spatial or temporal distribution of the pollutant or environmental parameter. All methods of sample collection, preservation, and analysis used in applying the standards should be in accord with those prescribed in 40 CFR Part 136.

Revised water quality standards criteria will need to reflect the conditions in individual areas. Some degree of instream biological monitoring will often be necessary, both for establishing the standards and in reviewing the effect of their implementation.

Criteria also may be expressed in terms of biological parameters such as bioassay or species diversity requirements provided that such criteria are stated in a manner that will support specific conforming control measures to be assigned on a case-by-case basis. An example of a biological criterion might be the prohibition of any deviation outside the range of normal variability for a given species diversity index. Modeling techniques generally are not sophisticated enough to relate a percent loss of diversity to a percent reduction in pollutants so wasteload allocations will need to be established based on best judgment as to cause and effect.

The State may elect to adopt 304(a) criteria by means of incorporation by reference, if State law authorizes that device. In that case, certain procedures should be followed to avoid confusion. First, the State should carefully identify the criteria being adopted (parameter and associated use) and the document being referenced (i.e. citation of 304(a) criteria document and date of publication). In addition, the State should explain what criteria will apply in the event that the incorporated materials are revised following adoption of the standards. Presumably, the State will specify that the incorporated criteria will continue to apply until the next State standards review, in order to assure compliance with State requirements for due process, including public hearings on revisions to standards. Finally, the State should specify the location or locations within the State where the criteria which have been incorporated by reference will be reasonably available to the public for inspection and copying.

B. Narrative Water Quality Criteria

States should provide in the water quality standards that all waters must meet the State's general narrative criteria. EPA recommends language consistent with that below:

All waters shall be free from substances attributable to man-caused point source or nonpoint source discharges in concentrations that:

1. Settle to form objectionable deposits;
2. Float as debris, scum, oil or other matter to form nuisances;
3. Produce objectionable color, odor, taste, or turbidity;
4. Injure, are toxic to or produce adverse physiological or behavior responses in humans, animals or plants; or
5. Produce undesirable aquatic life or result in the dominance of nuisance species.

These general narrative criteria can be used as a basis for control activities. Ecological principles and biological monitoring techniques can be used to quantitatively define violations of most of these narrative criteria. If it can be shown that harm has been caused to the balanced community of fish, shellfish and wildlife in the vicinity of a discharge due to settleable solids, for example, then those deposits can be termed objectionable and measures can be taken to restrict the discharge of settleable solids. Bioassays can be used to determine compliance with the narrative prohibition on toxicity. Guidance for applying some of these techniques can be found in the draft Section 316(a) guidance manual dated September 30, 1974.

The aesthetic criteria are harder to quantify in terms of violation. Photographic records or public complaints can provide a good indication of problems. If the source of such violation can be identified, control actions can be imposed by the regulatory agency based on such observations.

5.4 Antidegradation

A. General

Each State must develop and adopt (or retain) a Statewide anti-degradation policy in the water quality standards and identify methods for its implementation through other components of the State WQM process in accordance with §130.17(e). At a minimum the policy should contain the following components:

1. In all cases, existing instream beneficial water uses must be maintained and protected. Any actions that would interfere with or become injurious to existing uses cannot be undertaken. Waste assimilation and transport are not recognized beneficial uses;
2. Existing high quality waters must be maintained at their existing high quality unless the State decides to allow limited degradation where economically or socially justified. If limited degradation is allowed, it cannot result in violation of water quality criteria that describe the base levels necessary to sustain the national water quality goal uses of protection and propagation of fish, shellfish and wildlife and recreation in and on the water;
3. In all cases, high quality waters which constitute an outstanding national resource must be maintained and protected;

4. Any determinations concerning thermal discharge limitations under Section 316(a) of the Act will be considered to be in compliance with the antidegradation policy.

High quality waters consist of those waters at or above the minimum levels necessary to achieve the national water quality goal uses.

Existing approved antidegradation statements consistent with §130.17(e) may be retained, but procedures for implementation must be established through the State WQM process. The process will enable the State to determine on a case-by-case basis whether and to what extent water quality may be lowered consistent with §130.17.

B. Public and Intergovernmental Review

The State WQM process must provide that whenever an activity is proposed which may degrade existing high quality waters, the State will assure that there is adequate public and intergovernmental participation in accordance with section 5.11.C. of this Chapter.

Where the public and intergovernmental response, taken as a whole, clearly opposes a proposed degradation, the State must give serious consideration to that response and may not allow the proposed degradation activity unless a substantial and convincing justification for the activity has been presented.

C. National Resource Waters

Waters which constitute an outstanding national resource may not be degraded. At a minimum, waters in National and State parks, wildlife refuges and waters of exceptional recreational or ecological significance (for example, waters which provide a unique habitat for an identified threatened or endangered species or rivers designated under the National Wild and Scenic Rivers Act) should be considered as outstanding national resource waters. The State's intergovernmental review notice (see section 5.11.C) should include notice to the Federal, State, or other agencies responsible for administration of the waters or other resource involved. Such notice should specifically call attention to the possible characterization of the waters in question as an outstanding national resource.

EPA recommends that each State include in its water quality standards an initial listing of the outstanding national resource

waters of the State. Such a list would provide a ready identification of such waters. The possibility of additions or deletions from time to time should be expected.

D. Antidegradation and Growth

National antidegradation requirements should not be viewed as a "no growth" rule. Where the State intends to provide for further development, the State WQM process should evaluate the alternative measures which can be taken to preserve water quality at the levels required by §130.17. The evaluation must take into account the physical, chemical, and biological characteristics of the water. Examples of some techniques that can be used by the States include:

1. Designing wasteload allocations to accommodate new sources, via reduction in current source loadings;
2. Restricting any new discharge of pollutants from new and existing sources;
3. Restricting any increase in pollutants discharged from existing sources;
4. Adopting a no mixing zone policy, thus requiring safe concentrations to be met at the end of the pipe;
5. Requiring land disposal for new projects; and
6. Requiring new nonpoint source activities to demonstrate no permanent adverse impact on water quality.

E. Optional State Actions

The State's antidegradation policy is to be designed for the protection of existing water quality. Use designations should not be an issue, since the specific water quality standards should always, at a minimum, designate existing beneficial uses. The State's water quality standards for high quality waters may, within the constraints and limitations of monitoring practicability, set forth the existing water quality of a segment. Thus, the State may adopt specific criteria at existing levels measured in the segment, even though such levels may be more stringent than the Section 304(a) criteria minimum levels for given uses. Documentation of existing water quality may be useful in the State WQM process as a baseline against which any future degradation could be measured.

F. Federal Review of Antidegradation Policies and Actions

The State's antidegradation statement and implementing procedures, as a part of its water quality standards and WQM process, are subject to the Regional Administrator's review and approval. EPA encourages submittal of this statement and implementing procedures to the Regional Administrator for pre-adoption review so that the State may take EPA comments into account prior to final adoption.

5.5 Mixing Zones

A. General

A limited mixing zone, serving as a zone of initial dilution in the immediate area of a point or nonpoint source of pollution, may be allowed. Establishing a mixing zone policy is a matter of State discretion. Such a policy, however, must be consistent with the Act and is subject to the approval of the Regional Administrator.

Careful consideration must be given to the appropriateness of a mixing zone where a substance discharged is bioaccumulative and persistent or carcinogenic, mutagenic, or teratogenic. In such cases the State must consider the ecological and human health effects of assigning a mixing zone including such effects as bioconcentration in sediments and aquatic biota, bioaccumulation in the food chains, and the known or predicted safe exposure levels for the substance. In some instances, the ecological and human health effects may be so adverse that a mixing zone is not appropriate.

B. Definition of Allowable Mixing Zones

Water quality standards should describe the State's methodology for determining the location, size, shape, outfall design and in-zone quality of mixing zones, with sufficient precision to support such regulatory actions as issuance of permits and determination of BMP's for nonpoint sources. Specifications should relate to the individual water body. EPA recommends the following:

1. Location. Biologically important areas are to be identified and protected. Where necessary to preserve the zone of passage for migrating fish or other organisms in a water course, the standards should specifically identify the portion of the waters to be kept free from mixing zones.

2. Size. Various methods and techniques for defining the surface area and the volume of mixing zones for various types of waters have been formulated. Methods which result in quantitative measures sufficient for permit actions and which protect the designated uses of the water body as a whole are acceptable. The area or volume of an individual zone or group of zones must be limited to an area or volume that will not interfere with the designated uses or with the established community of aquatic life in the segment for which the uses are designated. The State WQM process growth projections should be taken into account in setting the total mixing zone size for the water course.

3. Shape. The shape of a mixing zone should be a simple configuration that is easy to locate in the body of water and that avoids impingement on biologically important areas. A circle with a specified radius is generally preferable, but other shapes may be specified in the case of unusual site requirements. "Shore-hugging" plumes should be avoided.

4. Outfall Design. Prior to designating any mixing zone, the State should assure that the design and location of the existing or proposed outfall provides maximum protection of aquatic resources.

5. In-zone Quality. Water quality standards should provide that all mixing zones conform with the following requirements. Any mixing zone should be free of point or nonpoint source related:

- (a) Materials in concentrations that exceed the 96-hour LC50 for biota significant to the indigenous aquatic community;
- (b) Materials in concentrations that settle to form objectionable deposits;
- (c) Floating debris, oil, scum and other matter in concentrations that form nuisances;

(d) Substances in concentrations that produce objectionable color, odor, taste or turbidity; and

(e) Substances in concentrations which produce undesirable aquatic life or result in a dominance of nuisance species.

C. Mixing Zones for the Discharge of Dredged or Fill Material

EPA, in conjunction with the Department of the Army, has developed interim guidelines to be applied in evaluating the discharge of dredged or fill material in navigable waters. (See 40 CFR Part 230, Federal Register, September 5, 1975.) The interim guidelines include provisions for determining the acceptability of mixing discharge zones (§230.5(e)). The particular pollutants involved should be evaluated carefully in establishing dredging mixing zones. Dredged spoil discharges generally result in a temporary short-term disruption and do not represent a continuous discharge of materials that will affect beneficial uses over a long period of time. A limited disposal operation whose primary pollutant is inert suspended solids may qualify for a mixing zone more readily than an operation discharging toxic pollutants. The potential for long-term disruption of beneficial uses should be the primary consideration in establishing mixing zones for dredged and fill activities. State water quality standards should reflect these principles if mixing zones for dredging activities are referenced.

D. Mixing Zones for Aquaculture Projects

The Administrator is authorized, after public hearings, to permit certain discharges associated with approved aquaculture projects (Section 318 of the Act). The regulations relating to aquaculture (40 CFR Part 115, proposed June 7, 1974) provide in part (§115.10(a)) that the aquaculture project must not result in a violation of standards outside of the project area, and project approval must not result in the enlargement of any previously approved mixing zone. In addition, the aquaculture regulations provide that designated projected areas must not include so large a portion of the body of water that a substantial portion of the indigenous biota will be exposed to the conditions within the designated project area (§115.10(e)). Areas designated for approved aquaculture projects should be treated in the same manner as other mixing zones. Special allowances should not be made for these areas.

5.6 Thermal Water Quality Standards

Water quality standards relating to heat are required by Section 303(g) of the Act to be consistent with the requirements of Section 316 of the Act. In keeping with the provisions of Section 303 and Section 316:

- . Water quality standards relating to thermal criteria must assure the protection and propagation of a balanced, indigenous population consistent with Section 316.
- . In areas in which a point source is entitled to the temporary immunities of Section 316(c), water quality standards should be established without regard to such immunity, but the standards may not serve as a basis for imposing effluent limitations on such source during the period of its immunity.

5.7 Water Quality Related Effluent Limitations Under Section 302 of the Act (RESERVED).

5.8 Stream Flows

A. Intermittent Streams

Water quality criteria should be adopted for intermittent streams to the extent necessary to assure that conditions in the streams or stream beds will not impair existing or designated uses in the stream or in downstream waters.

B. Low Flow

Water quality standards should protect water quality for designated uses in critical low flow situations, and individual sources or categories of sources should not be categorically exempted from compliance with such standards during critical low flow periods.

Wasteload allocations for the achievement of water quality standards may be based on a specified low flow which can be regarded as the critical low flow. This critical low flow must be established at a level which assures protection of beneficial uses designated in standards. In many cases, this will be the average seven-day low flow which occurs once in ten years. In extreme situations where flow falls below the critical low flow, the usually applicable standards may be violated. As an alternative to a critical low flow, States may adopt special low flow standards or policies to be met seasonally or at all times regardless of low conditions. Examples of situations where this may be appropriate include streams which are of a natural ephemeral or intermittent nature or streams where an endangered species is present and special standards are necessary to protect the species and its habitat.

The State WQM process should be designed to minimize the effect of conditions which may result from point source discharges or storm related nonpoint source runoff during low flow periods. For example, the WQM process may identify the need for NPDES permit conditions, such as higher treatment levels or reduced discharge volumes necessary to avoid or mitigate severe and long-lasting water quality impacts during critical periods. Seasonal limitations may be included, such as requiring seasonal control of certain pollutants during critical months.

In addition, the State WQM process may identify special procedures to be available to prevent major impacts as a result of low flow periods. Responses may include release of impounded waters, effluent or storm water storage or modification of industrial production schedules.

C. High Flow

Water quality standards should protect water quality in critical high flow situations, and individual sources or categories of sources, such as nonpoint sources, should not be categorically exempted from compliance with water quality standards.

The State WQM process should minimize the effects of conditions which may result during high flow periods. For example, permit conditions and BMP's for nonpoint sources should anticipate periods of critical high flow. Many types of nonpoint source problems are most intense during and after periods of precipitation, when flows are higher than at other times.

Extreme high flow, like extreme low flow, is not a required design criterion for sources severely affected by the extreme conditions. However, permits and nonpoint source controls should assure that in extreme high flow situations, man-induced incremental pollution will not result in severe and long-lasting water quality impacts. It may be appropriate for States to adopt specific standards to be met at all times, regardless of flow.

In addition, the State WQM process may identify special procedures to be available to prevent major impacts as a result of high flow periods. Responses may include curtailment of point source discharges, if appropriate, or other feasible and useful measures.

D. Regulated Flow

Flow augmentation and regulation is not a substitute for adequate treatment or control of pollutant sources, but may be an important consideration in WQM. Minimum flow rates for regulated waters should be specified in State water quality standards where necessary to protect and attain the appropriate beneficial uses of any waters.

5.9 Discharge of Dredged or Fill Material

As stated in section 5.5 of this Chapter, EPA has published interim guidelines to be applied in evaluating activities involving the discharge of dredged materials or fill material in navigable waters (40 CFR Part 230). Appropriate water quality standards must be considered when discharging dredged or fill material. The interim guidelines provide that:

"After application of the approaches presented in §230.4, the District Engineer will compare the concentrations of appropriate constituents to applicable narrative and numerical guidance contained in such water quality standards as are applicable by law. In the event that such discharge would cause a violation of such appropriate and legally applicable standards at the perimeter of the disposal site after consideration of the mixing zone, discharge shall be prohibited." (40 CFR §230.4-2.)

In addition the interim guidelines provide that:

"In evaluating whether to permit a proposed discharge of dredged or fill material into navigable waters, consideration shall be given to the need for the proposed activity, the availability of alternative sites and methods of disposal that are less damaging to the environment, and such water quality standards as are appropriate and applicable by law."

5.10 Groundwater

EPA recommends that States adopt water quality standards to protect the underground waters of the State. Such standards are not a Federal requirement; however, standards for groundwater are particularly desirable to protect waters which are a present or potential public drinking water supply source or have particular ecological or hydrographic significance.

5.11 State Water Quality Standards Review and Revision Procedures¹

A general description of the relationship between the Standards Review Process and State WQM Process is provided in Chapter 2.3.E ("Review/Revision of Water Quality Standards and Definition of Anti-degradation Policy"). See also Chapter 3.6.C.2 ("Specify Water Quality Standards and Antidegradation Policy"). The interdependency of the State WQM process and standards review/revision process makes it necessary to initiate both activities within the same time frame, commencing with certain simplifying assumptions and proceeding later to more appropriate refinement in both areas.

State water quality standards consist of water quality standards which are approved or promulgated by the EPA pursuant to Section 303 of the Act and consist of designated beneficial uses, water quality criteria to support those uses, antidegradation policy, and implementation plans established pursuant to Section 303(a) and (b).

A. Relationship to State WQM Process

40 CFR §130.10(c)(5) requires State water quality standards to be reviewed and revised in time to impact 1977-1983 management and regulatory decisions. This is imperative for State water quality standards to be a meaningful tool in pollution abatement. In this

¹EPA anticipates amending 40 CFR Part 120 to set forth the procedures for State review and revision and EPA approval and promulgation of water quality standards.

next three-year period of statutory mandated review/revision activities, revisions to standards which are adopted should be submitted to the Regional Administrator by January 1, 1977, to comply with 40 CFR §130.10(c)(5). The January 1 deadline will assure that standards revisions will be approved or disapproved and appropriate promulgation action taken in time to do the following:

1. Set the objectives for the initial WQM plans which, by court order, are due November 1, 1978.

2. Provide the necessary information for establishing water quality related effluent limitations in the second round of permits.

The State/EPA agreement on timing and level of detail for the development of State WQM plans (40 CFR §130.11) should provide for the completion of standards revisions in time to meet 40 CFR §130.10(c)(5) requirements. The State's schedule and milestones for reviewing and revising standards required pursuant to 40 CFR §130.10(c) must contain:

1. An identification of each designated areawide planning agency in the State which is involved in developing water quality standards recommendations and the date by which such agency is expected to make its recommendations to the State WQM agency.

2. The date when the State intends to submit its proposed water quality standards revisions to the Regional Administrator.

3. A list of the public hearings which are expected to be held on the existing and proposed standards and the tentative dates for such hearings.

4. The projected dates when revisions to water quality standards will be adopted and submitted to the Regional Administrator.

B. Proposed Revisions

States should work closely with their Regional Offices in developing proposed revisions to standards. Such a relationship will facilitate the development of proposed revisions which meet the requirements of the Act and expedite the Agency review process.

Each State should submit three copies of its proposed water quality standards revisions to the Regional Administrator and identify the proposed changes or additions in the submittal. The Regional Administrator may submit comments to the State on the proposed revisions if comments would be beneficial.

C. Public Participation and Intergovernmental Coordination

The States should provide for maximum public participation and intergovernmental coordination in the standards review/revision process. Public hearings are a mandatory requirement of the process. All such activities should be conducted as a part of the State WQM process. The guidelines on public participation in Chapter 4 set forth the need and legal requirements for public participation and contain the principles for structuring public involvement.

The objective of the public participation and intergovernmental coordination requirements is to involve the public and government institutions in the review and revision of existing State water quality standards in a meaningful way. They can make valuable contributions toward establishing overall water quality goals and expectations for the State. The public and government institutions also can play a key role in developing the public support that will ultimately lead to acceptance and implementation of the standards and achievement of the national water quality goal specified in Section 101(a)(2) of the Act.

In providing for public participation and intergovernmental response, the requirements in 40 CFR Part 105 are applicable. Such requirements include but are not limited to the following:

1. A notice of the public hearing(s) must be published which includes:
 - a. Time and location of hearing;
 - b. Hearing agenda;
 - c. Notification of the availability of a Fact Sheet as required under Part 105.7(f). The sheet must outline the major issues to be discussed, relevant tentative State staff reports on standards, determinations on proposed revisions, and any additional information the public should be aware of prior to the hearing which is germane to the issues; and
 - d. The location where reports, documents, and data to be discussed at the hearing are available for public inspection.

2. Notice of the public hearing must be mailed to interested and affected persons and organizations including private and government organizations and individuals who have filed with the State requesting such notices. Notice of hearings must also be mailed to downstream States and Federal and State agencies which are affected or potentially could be affected by existing State water quality standards or proposed revisions thereto.

The hearing notice(s) should solicit comments and provide opportunity for public comment. The State must prepare transcripts of the hearing(s) or a summary which must be available for inspection by the Regional Administrator and the public.

To facilitate EPA review of existing or revised State water quality standards, States should supply the Agency with any documentation or information on review/revision activities which is requested. A central file containing information documenting review/revision activities should be maintained. Such a file is helpful in answering information requests by the Agency and public.

Documentation may be needed by EPA to assess whether existing or revised State water quality standards meet the requirements of the Act. Examples include the rationale for:

1. Why standards for a segment were not revised;
2. Why a particular criterion was not adopted; or
3. Why data or other information was or was not considered in reviewing or revising State water quality standards.

D. Submittal of State Adopted Revisions

The Governor or his designee should submit to the Regional Administrator three copies of revisions to State water quality standards which are adopted. The submittal should also include the following information which will be helpful in reviewing the revisions and determining whether the revisions meet the requirements of the Act:

1. A statement by the State Attorney General or other appropriate legal authority within the State that the revised water quality

standards were duly adopted by the State and are included within State law. (Note that standards are an element of the State WQM plan and regulatory programs implementing the plan must assure that water quality standards are met (see 40 CFR Part 130). It is through these regulatory mechanisms that standards are enforced under State law.)

2. The identification of specific water segments which have water uses in the revised water quality standards which are at the national water quality goal levels or which are less restrictive than the national water quality goal uses.

A "less restrictive use" for the purpose of Part 120 is a use which requires a lower level of water quality to be maintained and protected.

3. The identification of the specific water segments which have water uses in the revised water quality standards that have been upgraded.

4. The identification of the specific water segments which have water uses in the revised water quality standards which are more restrictive than the existing designated beneficial water uses.

5. Identification of specific water segments with revised standards which have less stringent water quality criteria than those criteria contained in the Administrator's Quality Criteria for Water document for the appropriate use or water conditions.

6. A summary of the intergovernmental coordination and public participation which transpired in the development and adoption of the revised water quality standards. The summary should include a discussion of the important comments received. When requested by the Regional Administrator, the State should also submit its rationale for adopting the revised water quality standards.

The rationale often may be an important factor in determining whether to approve or disapprove a revision. The Regional Administrator can request the rationale for the revisions actually adopted as well as for the rejection of other alternatives considered.

E. EPA Review, Approval, Disapproval and Promulgation

The Regional Administrator must review the revised water quality standards and approve or disapprove the revision. A standard is revised only where there has been a substantive change in that

standard. Where the changes are not substantive (e.g. changing the numbering system of a regulation or a document title but not the content of the standards), it is not necessary to approve or disapprove the change. Any change, however, should be submitted to the EPA for a determination as to its substantive nature. Depending on the nature of a non-substantive change, 40 CFR Part 120 may have to be corrected to reflect the change.

1. Approval

Revisions to State water quality standards must be approved by the Regional Administrator if they meet the requirements of the Act and 40 CFR Parts 130 and 120. When only a portion of the revisions submitted meet the requirements of the Act, the Regional Administrator can only approve that portion. The Regional Administrator should promptly notify the Governor by letter of the approval and forward a copy of the letter to the appropriate State agency with any additional information which may be helpful in understanding the scope of the approval action and in conducting future review/revision activities.

Where it is evident that the subsequent occurrence of particular events could or will result in a failure of the approved standards to continue to meet the requirements of the Act, those events should be identified in the approval letter to facilitate review/revision activities.

The Regional Offices are responsible for preparing the Federal Register notice of approval amending 40 CFR Part 120 and the accompanying action memorandum. The notice should contain a description of the State water quality standards as they are affected by the approved revisions. The notice must reference the documents containing the approved State water quality standards, give the dates of adoption and approval, and include the text of any previous promulgation actions.

The Regional Offices must forward the notice and memorandum to the Deputy Assistant Administrator for Water Planning and Standards (WH-551) for format review. The notice will then be transmitted to the Federal Register by the Assistant Administrator for Water and Hazardous Materials. With the submittal, the Regional Offices must also forward a copy of each of the following:

- . The letter from the appropriate State authority certifying that the standards were duly adopted and are included within State law;

- . The letter transmitting the revisions from the State to EPA for approval;
- . EPA approval letter; and
- . Copy of the approved revisions.

2. Disapproval

If the Regional Administrator determines that the revisions submitted or the existing water quality standards themselves are not consistent with or do not meet the requirements of the Act, the Regional Administrator must disapprove such standards by notifying the Governor of the State by letter of that fact. The letter must state the reason that the revision submitted or the existing water quality standards are not consistent with the Act and the specific revisions to State water quality standards which must be adopted to obtain full approval of the revised standards. The letter must also notify the Governor that the Administrator will initiate promulgation proceedings if the State fails to adopt and submit the necessary revisions within 90-days after the date of notification.

A revision whose subject matter is not an acceptable constituent element of State water quality standards (e.g. Grandfather clause or effluent guideline) and which is not consistent with the applicable requirements of the Act must be disapproved. The Regional Administrator must notify the State as required above stating that such revisions must be deleted from water quality standards in order to meet the requirements of the Act. If the deletion is not made, the Administrator must proceed to promulgate as necessary to supersede the inconsistent revision (303(c)(4) of the Act).

3. Promulgation

Promulgation proceedings are initiated by the preparation and publication of proposed regulations setting forth revised State water quality standards. As soon as possible after the expiration of the 90 days, proposed revisions should be published in the Federal Register. A public hearing(s) must be held on the proposed standards. Within 90 days of their proposal, standards must be promulgated after giving due consideration to comments received as a result of intergovernmental coordination and public participation.

The Regional Office has a major role in promulgating standards. They should assist the Administrator by providing the necessary background information and participating in public hearings. They also have primary responsibility for preparing the notices of proposed and final rulemaking and the action memoranda. The documents should be forwarded to the Deputy Assistant Administrator.

If a State remedies the deficiencies in State water quality standards by adopting revised standards which the Regional Administrator determines meet the requirements of the Act prior to promulgation, the Administrator will promptly terminate promulgation proceedings.

4. Withdrawal Notices

A. Proposed Rulemaking

Whenever promulgation proceedings are terminated a notice of withdrawal of the proposed rulemaking must be published in the Federal Register. The Regional Offices are responsible for preparing the notice for the Administrator's signature as well as the action memorandum. Both documents should be forwarded to the Deputy Assistant Administrator.

B. Disapproval

Water quality standards submitted for approval must either be approved or disapproved. Disapproval must be followed by an EPA promulgation. Whenever a disapproval is not followed by promulgation, the disapproval should be withdrawn by the Agency. Where the withdrawal pertained to a disapproval of revisions submitted for approval, the Regional Administrator must promptly approve the revisions.

C. Promulgation

A promulgated standard should be withdrawn when it is no longer necessary to assure that State water quality standards meet the requirements of the Act. Withdrawal may be desirable for a variety of reasons. For example:

- . The State complied fully with a promulgation which required it to take a particular action; or

. EPA approved revisions to State water quality standards where the revisions included the substantive content of a previous promulgation.

In such a situation, the Regional Offices should prepare the notice of withdrawal for the Administrator's signature and the action memorandum. The documents should be forwarded to the Deputy Assistant Administrator.