Presented below are water quality standards that are in effect for Clean Water Act purposes.

EPA is posting these standards as a convenience to users and has made a reasonable effort to assure their accuracy. Additionally, EPA has made a reasonable effort to identify parts of the standards that are not approved, disapproved, or are otherwise not in effect for Clean Water Act purposes.

Hopi Water Quality Standards

Prepared by
The Hopi Tribe
Water Resources Program
Kykotsmovi, Arizona

June 4, 2008

Revised November, 2010

Ordinance # ___ of the Hopi Tribe

Title II
Hopi Water Quality Standards

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List of Acronyms and Abbreviations

$A\&W_e$: Aquatic and wildlife (ephemeral habitat)

$A\&W_w$: Aquatic and wildlife (warm water habitat)

AgI: Agricultural irrigation

AgL: Agricultural livestock watering

CU: Color units

cfu: Colony forming units

DO: Dissolved oxygen

DWS: Domestic water source

EPA: U.S. Environmental Protection Agency

FBC: Full body contact

FDA: U.S. Food and Drug Administration

FC: Fish consumption

FTU: Formazin turbidity units, a measure of turbidity in water

GWR: Groundwater recharge

MCL: Maximum contaminant level

µg/L: Micrograms per liter

mg/L: Milligrams per liter

NNS: No numerical standard

NPDES: National Pollutant Discharge Elimination System

NTU: Nephelometric turbidity units, a measure of turbidity in water

PBC: Partial body contact

PCBs: Polychlorinated biphenyls

PCC: Primary contact ceremonial use

pCi: Picocurie

Chapter 1.Introduction, Authority, Applicability, General Provisions, and Exclusions

Section 1.101 Authority

Pursuant to Section 518 of the Clean Water Act[1], and Tribal Ordinance #___, the Hopi Water Quality Code, the Hopi Tribe, a federally recognized Indian Tribe acting through the Tribal Council or the Hopi Water Resources Program, hereby enacts the Hopi Water Quality Standards.

Section 1.102 Purposes, Applicability and Exclusion

A. The purposes of the Hopi Water Quality Standards (hereinafter Standards) are as follows:
   1. to designate the existing and attainable uses for which the surface waters and groundwaters of the Hopi Tribe shall be protected;
   2. to prescribe water quality standards (narrative and numeric) imposed in order to sustain the designated uses;
   3. to prescribe water quality standards (narrative and numeric) imposed in order to protect groundwater;
   4. to ensure that degradation of existing water quality does not occur; and
   5. to promote the health, social welfare and economic well-being of the Hopi people.

   These purposes shall be accomplished by incorporating the Standards established herein into the permitting and management process for point source dischargers and nonpoint source generators, by using those standards to determine when a designated use is threatened, and by using (1) current treatment technologies to control point sources of pollution and (2) best management practices to control nonpoint sources of pollution.

B. The Standards apply to all Hopi waters, inclusive of all waters within the exterior boundaries of the Hopi Indian Reservation, and water situated wholly or partly within or bordering upon the Reservation. The criteria apply to substances attributable to discharges, nonpoint sources, or instream activities. The criteria shall not apply to natural phenomena not brought about by human activity.

C. The Standards are consistent with Section 101(a)(2) of the Clean Water Act (33 U.S.C. Section 1251(a)(2)), which declares that "it is the national goal that, wherever attainable, an interim goal of water quality which provides for the protection and propagation of fish, shellfish, and wildlife and provides for recreation in and on the water be achieved by July 1, 1983 . . . ." In addition to these uses, primary contact ceremonial use, domestic water source,

[1]33 U.S.C. Section 1377 (enacted February 4, 1987).

groundwater recharge, and agricultural and livestock water supply use are other uses of the Hopi waters.

The Standards provide that any contamination that may result from such uses shall not lower the quality of the water below that which is required for recreation, protection and propagation of fish, shellfish and wildlife, primary contact ceremonial use, domestic water source, and agricultural and livestock water supply use or below the narrative and numeric criteria designated to protect groundwater.

Section 1.103 Enforcement and Antidegradation

A. Enforcement of the Water Quality Standards established herein is the duty and responsibility of the Director of the Hopi Water Resources Program. The Hopi Water Resources Program shall work in cooperation with the U.S. Environmental Protection Agency (EPA) and other agencies of the federal government or of the State of Arizona.
B. The antidegradation policy for Hopi waters and the procedures for implementing it are set forth in Chapter 2 herein.

Section 1.104 Periodic Review and Revision

Pursuant to Section 303(c)(1) of the Clean Water Act (33 U.S.C. Section 1313(c)), the Hopi Tribe shall hold public hearings at least once each 3-year period for the purpose of reviewing and, as appropriate, amending the Standards. The Standards shall be reviewed once every 3 years following enactment. Revisions shall incorporate relevant scientific and engineering advances.

Section 1.105 Surface Water Use Designations, Tributary Streams

A. The Hopi Tribe shall issue and approve surface water designations for Hopi waters and shall determine the suitability of bodies of water for recreational or other purposes.
B. Standards particular to a use shall be protected at all times, including periods of low flow rates. Where this low flow value is zero due to natural discharge fluctuations, all discharges shall meet standards for the designated uses. For standing water bodies, standards particular to a use shall be maintained whenever the water body is suitable for the use. The General Standards (Chapter 3) shall be maintained at all times and shall apply to streams, lakes, reservoirs, canals, drains, groundwater, ponds, springs, and wetlands, whether perennial, ephemeral, or intermittent in nature. The standards assigned to a body of water shall be the most stringent standards required to protect all uses designated for that body of water. Reservoirs constructed outside Hopi surface waters used for domestic wastewater treatment

are exempt from these standards, provided, however, that the water released from any such reservoir meets the standards that apply to the receiving body of water.

Section 1.106 Point and Non-Point Discharges

The Standards shall be the basis for managing discharges attributable to point and nonpoint sources of pollution. The Standards are not used to control, and are not invalidated by, natural conditions or acts of nature.

Section 1.107 Attainability and Modification

In the event that monitoring of water quality identifies reaches where attainable water quality is less than that which is required by the Standards, then the Hopi Tribe may modify the Standards to reflect attainability. Modification thereof shall be within the sole discretion of the Hopi Tribe, but shall be subject to the provisions of the Clean Water Act (33 U.S.C. Section 1251(a)(2)) and shall be carried out in accordance with use-attainability analysis procedures or development of site-specific criteria.

Section 1.108 New Data, Errors, and Exclusion

A. In addition to the triennial reviews, the Standards may be revised from time to time, or as the need arises, or as the result of updated scientific information.
B. Errors resulting from inadequate and erroneous data or human or clerical oversight will be subject to correction by the Hopi Tribe. The discovery of such errors does not render the remaining and unaffected standards invalid. If any provision of the Standards, or the application of any provision of these Standards to any person or circumstance, should be held to be invalid, the application of such provision to other persons and circumstances and the remainder of the Standards shall not be affected thereby.
C. The Standards prescribed herein do not apply to waste treatment systems, including ponds, lagoons, and constructed wetlands that are a part of such waste treatment systems. This exclusion applies only to man-made bodies of water that neither are originally created in a Hopi surface water nor result from the impoundment of a Hopi surface water.

Section 1.109 Variances

A. The Tribal Council may allow variances from these standards on a case-by-case and pollutant-by-pollutant basis. A variance from the Hopi criteria may be allowed in certain cases where the appropriateness of the specific criterion is questionable. The variance provides a period of time during which issues concerning the appropriateness of the criterion may be

resolved, but shall be valid for no more than three years. Variances are not renewable but may be reissued upon adequate justification. A variance shall be granted only after appropriate public participation and review and approval by the Hopi Water Resources Program and the U.S. Environmental Protection Agency.

B. Variances from criteria will be allowed for anticipated non-attainment of water quality standards due to one or more of the reasons listed in 40 CFR 131.10 (Use-attainability reasons). Variances from criteria shall be for specific pollutants, shall specify time limits, and shall not forego the current designated use. Variances are to be issued instead of removing a designated use for a waterbody where such use is not now attainable but can be expected with reasonable progress toward water quality.

Section 1.110 Short-Term Exceedances

The Hopi Tribe Water Resources Program, with consent from the Tribal Council, may authorize short-term activities that may cause temporary violations of the water quality standards if the Tribe determines that these activities are necessary to accommodate legitimate uses or emergencies or to protect the public health and welfare. A short-term exceedance will only be allowed for activities that are not likely to cause permanent or long-term impairment of beneficial uses. They will be allowed for activities such as, but not limited to, bank stabilization, wetlands restoration, algae and weed control, hydrological studies that use tracers, or activities that result in overall enhancement or maintenance of beneficial uses. Such authorization may not be granted for activities that could result in adverse impact on any federally endangered or threatened species or on the critical habitat of such species. The Hopi Tribe Water Resources Program shall specify the degree of exceedance, the time limit, and where applicable, restoration procedures. Nothing herein shall be intended to supersede existing Hopi and federal permitting processes or requirements.

Chapter 2. Antidegradation Policy and Implementation Plan

Section 2.101 Antidegradation Policy

A. Existing uses shall be maintained and protected and the level of water quality necessary to protect existing uses shall be maintained.

B. Where existing water quality exceeds levels necessary to support propagation of fish and wildlife and recreation in and on the water, that level of water quality shall nonetheless be maintained and protected unless it is found, except in unique waters, after full satisfaction of governmental and public participation requirements, that a lower level of water quality is

required in order to accommodate important economic or social development in the area of or downgradient of the waters. In no case shall water quality be decreased below that necessary to fully maintain the designated beneficial uses. In allowing such degradation of water quality, the Hopi Tribe shall impose the most protective statutory and regulatory requirements for point sources and shall impose best management practices for nonpoint sources.

C. Where high quality waters constitute an outstanding national or tribal resource, or waters of exceptional recreational or ecological significance, the water quality and uses of those unique water bodies shall be maintained and protected by controls on water quality, maintenance of natural flow regimes, and protection of instream habitats, or as set forth in Chapter 7.

D. In those cases where potential water quality impairments associated with thermal discharge are involved, the antidegradation policy and implementation method shall be consistent with Section 316 of the Clean Water Act, as amended (33 U.S.C. Section 1326 (1987)).

Section 2.102 Implementation Plan

A. Acting under the authority delegated by the Hopi Tribal Council, pursuant to the Hopi Water Quality Code, the Hopi Water Resources Program shall implement the Hopi Water Quality Standards, including the antidegradation policy, by establishing and maintaining controls on the introduction of pollutants into surface and groundwaters. In addition, the Tribal Council may adopt additional regulations for enforcement of these water quality standards. More particularly, the Water Resources Program shall do the following:

   1. Monitor water quality to assess the effectiveness of pollution controls and to determine whether water quality standards are being attained.
   2. Obtain information as to the impact of effluents on receiving waters.
   3. Advise prospective dischargers of discharge and/or permit requirements.
   4. Review the adequacy of the existing database and obtain additional data when required.
   5. Assess the probable impact of effluents on receiving waters in light of designated uses and numeric and narrative standards.
   6. Require the highest and best degree of wastewater treatment that is cost-effective and commensurate with protecting and maintaining designated uses and existing water quality.
   7. Develop water quality-based effluent limitations and comment on technology-based effluent limitations, as appropriate, for inclusion in any federal permit issued to a discharger pursuant to Section 402 of the Clean Water Act (33 U.S.C. Section 1342).

8. Require that these effluent limitations or any other appropriate limitations applicable to mining or other activities be included in any such permit as a condition for Tribal certification pursuant to Section 401 of the Clean Water Act (33 U.S.C. Section 1341).
9. Coordinate water pollution control activities with other local, state, tribal, and federal agencies, as appropriate.
10. Develop and pursue inspection and enforcement programs in order to ensure that dischargers comply with requirements of the Hopi Water Quality Standards and any requirements promulgated thereunder, and in order to support the enforcement of federal permits by the EPA.
11. Provide continuing technical training for wastewater treatment facility operators through training and certification programs.
12. Pursue funds to assist in the construction of publicly owned wastewater treatment facilities through the construction grants and revolving funds program authorized by the Clean Water Act (33 U.S.C. Section 1281) and other federal funds available for the purpose.
13. Encourage, in conjunction with other agencies, voluntary implementation of best management practices to control nonpoint sources of pollutants to achieve compliance with the Standards.
14. Require that sufficient instream flows be maintained to meet the narrative and numeric criteria specified herein.
15. Require that surface and groundwater withdrawals do not cause degradation of unique surface or groundwater bodies.
16. Examine existing and future Hopi policies pertaining to septic systems, solid waste disposal, range management practices, and any other relevant activities to ensure that these policies are sufficient to meet the criteria specified herein.
17. Ensure that groundwater withdrawals do not occur in quantities that will cause degradation of springs or riparian habitat.
18. Conduct an antidegradation analysis for regulated actions that may potentially impair water quality, as detailed in Figure 1.
19. Evaluate the effectiveness of best management practices to prevent or abate nonpoint sources of pollution.
20. Ensure that the provisions for public participation required by the Clean Water Act are followed.
21. Provide other technical support as necessary to accomplish the objectives of these standards.

Unless and until the EPA delegates to the Hopi Tribe primary responsibility for National Pollutant Discharge Elimination System (NPDES) permitting, the EPA will develop and issue the permits for discharges on Hopi lands, and these permits shall comply with these standards.

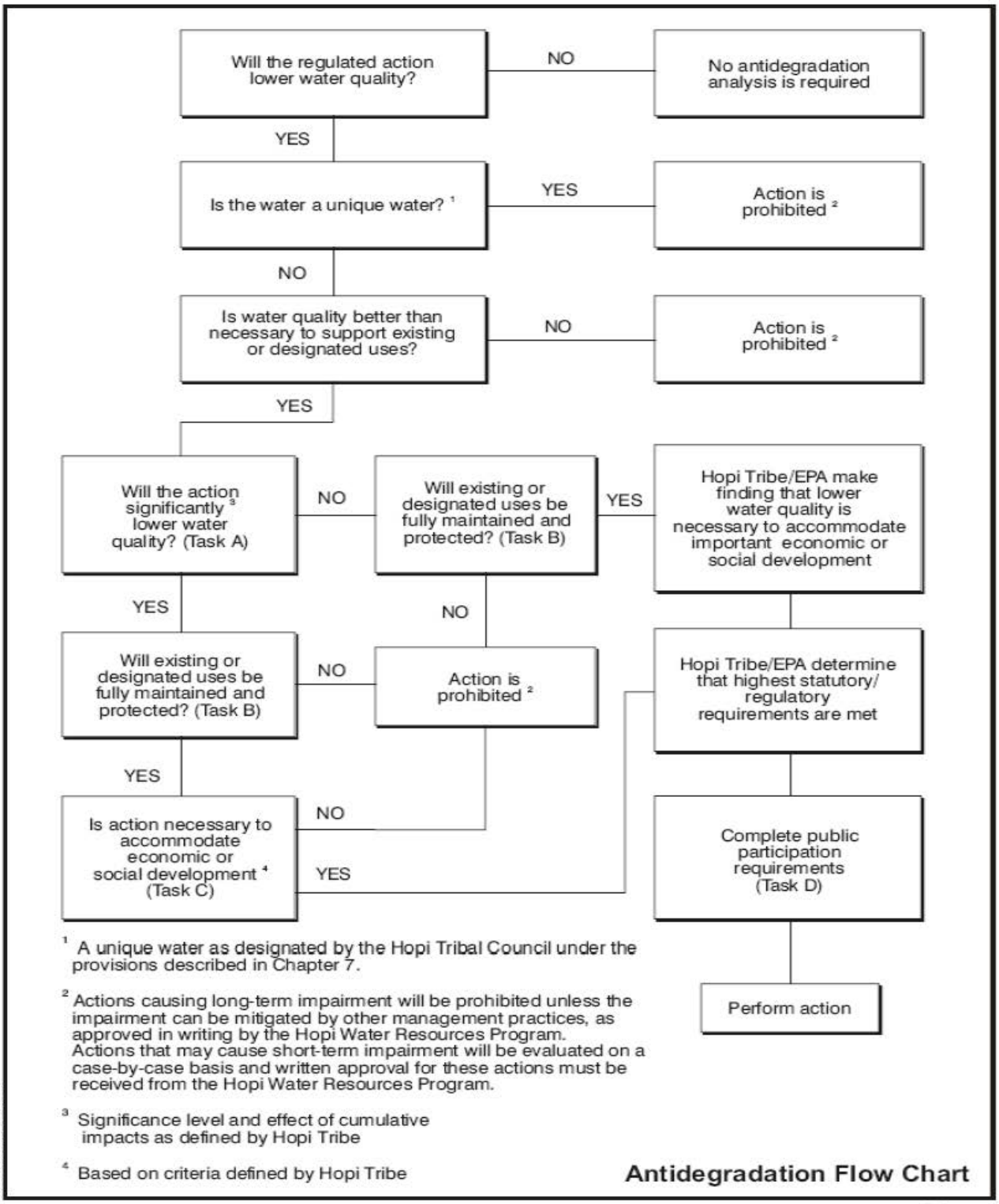
Will the regulated action lower water quality?
NO
No antidegradation analysis is required
YES
Is the water a unique water? 1
YES
Action is prohibited 2
NO
Is water quality better than necessary to support existing or designated uses?
NO
Action is prohibited 2
YES
Will the action significantly 3 lower water quality? (Task A)
NO
Will existing or designated uses be fully maintained and protected? (Task B)
YES
Hopi Tribe/EPA make finding that lower water quality is necessary to accommodate important economic or social development
YES
NO
Will existing or designated uses be fully maintained and protected? (Task B)
NO
Action is prohibited 2
Hopi Tribe/EPA determine that highest statutory/ regulatory requirements are met
YES
Is action necessary to accommodate economic or social development 4 (Task C)
NO
YES
Complete public participation requirements (Task D)
Perform action
1 A unique water as designated by the Hopi Tribal Council under the provisions described in Chapter 7.
2 Actions causing long-term impairment will be prohibited unless the impairment can be mitigated by other management practices, as approved in writing by the Hopi Water Resources Program. Actions that may cause short-term impairment will be evaluated on a case-by-case basis and written approval for these actions must be received from the Hopi Water Resources Program.
3 Significance level and effect of cumulative impacts as defined by Hopi Tribe
4 Based on criteria defined by Hopi Tribe
Antidegradation Flow Chart
T:\VDR\707\5\707505K.CDR

Figure 1

Chapter 3. General Standards

Section 3.101

The following General Standards apply to all surface and groundwaters of the Hopi Tribe, including intermittent and ephemeral streams, provided, however, that where Chapters 4 and 5 set stricter standards for designated water bodies, the stricter standards supersede the General Standards:

A. Stream Bottom Deposits: Surface waters shall be free from contaminants from other than natural causes that may settle and have a deleterious effect on the aquatic biota or that will significantly alter the physical or chemical properties of the water or the bottom sediments.

B. Floating Solids, Oil, and Grease: Surface waters shall be free from objectionable oils, scum, foam, grease, and other floating materials and suspended substances of a persistent nature resulting from other than natural causes (including visible films of oil, globules of oil, grease, or solids in or on the water, or coatings on stream banks). As a guideline, oil and grease discharged into surface waters shall not exceed 10 mg/liter average or 15 mg/liter maximum.

C. Color: Surface waters shall be free from the true color-producing materials (other than those resulting from natural causes) that create an aesthetically undesirable condition. Color shall not impair the designated and other attainable uses of a water body. Color-producing substances from other than natural sources are limited to concentrations equivalent to 70 color units (CU).

D. Odor and Taste: Contaminants from other than natural causes are limited to concentrations that do not impart unpalatable flavor to fish, that do not result in offensive odor or taste arising from the water, and that do not otherwise interfere with the designated and other attainable uses of a water body. Taste and odor-producing substances from other than natural origins shall not interfere with the production of a potable water supply by modern treatment methods.

E. Nuisance Conditions: Plant nutrients or other substances stimulating algal growth from other than natural causes shall not be present in concentrations that produce objectionable algal densities or nuisance aquatic vegetation, or that result in a dominance of nuisance species instream, or that cause nuisance conditions in any other fashion. Phosphorus and nitrogen concentrations shall not be permitted to reach levels that result in man-induced eutrophication problems. As a guideline, total phosphorus shall not exceed 100 μg/L instream or 50 μg/L in lakes and reservoirs, except in waters highly laden with natural silts or color that reduces the penetration of sunlight needed for plant photosynthesis, or in other waters where it can be demonstrated that algal production will not interfere with or adversely affect designated and

other attainable uses. Alternative or additional nutrient limitations for surface waters may be established by the Hopi Tribe and incorporated into water quality management plans.

F. Pathogens: Waters shall be free from pathogens (bacteria, viruses, or parasites). Waters used for irrigation of table crops (e.g., lettuce) shall be free of salmonella and shigella species.

G. Turbidity: Turbidity attributable to other than natural causes shall not reduce light transmission to a point at which aquatic biota are inhibited or to a point that causes an unaesthetic and substantial visible contrast with the natural appearance of the water. Numeric criteria for turbidity are included in Appendix A, Table A-1.

H. Mixing Zones: Where effluent is discharged into surface waters, a continuous zone shall be maintained in which the water is of adequate quality to allow the migration of aquatic life with no significant effect on their population. The cross-sectional area of wastewater mixing zones shall generally be less than one quarter of the cross-sectional area or flow volume of the receiving stream. Mixing zones in lakes may be assessed and limited on a case-by-case basis. Mixing zones containing permitted effluent shall not overlap recreational or ceremonial use sites. Water quality standards shall be maintained throughout zones of passage. Zones of passage in lakes and intermittent streams may be designated on a site-specific basis. The water quality in a zone of passage shall not be permitted to fall below the standards for the designated water body(ies) within which the zone is contained. With regard to toxicity in mixing zones, see Subsection 3.O. Mixing zones are prohibited in ephemeral waters or where there is no water for dilution.

I. Radioactive Materials: Concentrations of radioactive constituents shall not exceed the concentration caused by naturally occurring materials. Numeric criteria for radioactive materials are included in Appendix A, Tables A-1 and A-2.

J. Temperature: The introduction of heat by other than natural causes shall not increase the temperature in a stream, outside a mixing zone, by more than 2.7°C, based upon the monthly average of the maximum daily temperatures measured at mid-depth or 3 feet (whichever is less) outside the mixing zone. In lakes, the temperature of the water column or epilimnion (if thermal stratification exists) shall not be raised more than 1.7°C (3°F) above that which existed before the addition of heat of artificial origin, based upon the average of temperatures taken from the surface to the bottom of the lake, or surface to the bottom of the epilimnion (if stratified). The normal daily and seasonal variations that were present before the addition of heat from other than natural sources shall be maintained. High water temperatures caused by unusually high ambient air temperatures are not violations of these standards.

K. Salinity/Mineral Quality (total dissolved solids, chlorides, and sulfates): Existing mineral quality shall not be altered by municipal, industrial, and instream activities, or other waste discharges, so as to interfere with the designated or attainable uses for a water body. An increase of more than one-third over naturally occurring levels or levels that will be detrimental to the salinity levels set in the *2005 Review, Water Quality Standards for Salinity, Colorado River System, October 2005* shall not be permitted. Numeric standards for salinity/mineral quality are presented in Appendix A, Table A-1.

L. pH: Water quality standards for pH, expressed in standard units, are included in Appendix A, Table A-1.

M. Dissolved oxygen: If a stream or other water body is capable of supporting aquatic biota, dissolved oxygen standards presented in Appendix A, Table A-1 shall apply.

N. Fecal coliform and E. coli bacteria: Water quality standards for fecal coliform and E. coli bacteria are presented in Appendix A, Table A-1.

O. Toxic Substances:

1. Toxic substances shall not be present in receiving waters in quantities that are toxic to human, animal, plant, or aquatic life, or in quantities that interfere with the normal propagation, growth, and survival of the sensitive indigenous aquatic biota. Within the mixing zone, there shall be no acute toxicity. There shall be no chronic toxicity at the edge of the mixing zone. For toxic substances lacking EPA-published criteria, biomonitoring data may be used to determine compliance with this narrative standard in accordance with EPA standard acute and chronic biological test protocols. These protocols can be found in *Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms*, EPA 821/R-02-012, and *Short Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms*, EPA 821/R-02-013. Additional guidelines can be found in the EPA documents *Technical Support Document for Water Quality-Based Toxics Control*, *Post-Third Round Permitting Strategy*, and *Quality Criteria for Water*.

   Should the Hopi Tribe need to derive numeric criteria without actually conducting toxicity tests, it shall use the ECOTOX (ECOTOXicology) database and EPA's guidance, *Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and their Uses* (Stephan et al., 1985, PB85-227049), to calculate any criteria. If sufficient data are not available to derive a numeric criterion following the

above guidance, the Tribe may use the results of toxicological studies to calculate a criterion based on the following methods:

(a) Concentrations of non-persistent toxic materials shall not exceed concentrations that are chronically toxic (as determined from appropriate chronic toxicity data or calculated as 10% of LC_{50} values) to representative sensitive aquatic organisms.

(b) Concentrations of persistent toxic materials that do not bioaccumulate shall not exceed concentrations that are chronically toxic (as determined from appropriate chronic toxicity data or calculated as 5% of LC_{50} values) to representative sensitive aquatic organisms.

(c) Concentrations of toxic materials that bioaccumulate shall not exceed concentrations that are chronically toxic (as determined from appropriate chronic toxicity data or calculated as 1% of LC_{50} values) to representative sensitive aquatic organisms.

Toxicants in the receiving water known to be persistent, bioaccumulative, carcinogenic, and/or synergistic with other waste stream components may be addressed on a case-by-case basis.

2. The numerical water quality standards that apply for toxic substances for specific uses are listed in Appendix A, Table A-2, of these Water Quality Standards. These standards are adopted from the State of Arizona Department of Environmental Quality Water Quality Standards and published criteria documents. As new criteria documents for toxic substances are published by EPA, these will become incorporated into and made a part of the Appendix of the Hopi Water Quality Standards, during triennial review, and the numeric criteria established by EPA shall equally apply. Numeric criteria for carcinogens will reflect a risk level of one in one million (10^{-6}).

3. For specific segments where the above criteria may need to be recalculated using appropriate species or water quality factors, the Hopi Tribe may, after public participation and EPA approval, adopt site-specific criterion modifications.

4. Because pesticides and polychlorinated biphenyls (PCBs) can accumulate in bottom sediments and tissues of aquatic organisms, sediment and tissue analyses shall be used when appropriate to complement water analyses. Chemical concentration levels in tissues of aquatic organisms that exceed FDA action levels or risk-based tissue criterion shall require investigation.

Chapter 4. Water Body Uses and Standards Specific to the Uses

Section 4.101 Applicability of Uses and Standards

The water quality standards prescribed in this chapter and in the Appendix to these Standards apply to all Hopi groundwaters and surface waters and their tributaries. The numeric standards specific to the uses are listed in Appendix A.

Section 4.102 Specific Water Quality Uses and Standards

The following Water Quality Standards and Uses are hereby established:

A. Aquatic and Wildlife (Warm Water Habitat) ($A\&W_w$). A warm water habitat is a stream reach, lake, or impoundment where water temperature and other characteristics are suitable for support and propagation of animals, plants, or other organisms (excluding salmonids). Standards specific to the use are presented in Appendix A.

C. Aquatic and Wildlife (Ephemeral) ($A\&W_e$). An ephemeral habitat is a stream reach, lake, or other water body where water temperature and other characteristics are periodically suitable for support and propagation of animals, plants, or other organisms (excluding salmonids). Standards specific to the use are presented in Appendix A.

D. Primary Contact Ceremonial (PCC). Primary contact ceremonial means the use of a spring, stream reach, lake, or other water body for religious or traditional purposes by members of the Hopi Tribe; such use involves immersion and intentional or incidental ingestion of water, and it requires protection of sensitive and valuable aquatic life and riparian habitat. Standards specific to the use are presented in Appendix A.

E. Full Body Contact (FBC). Full body contact means the use of a surface water that causes the human body to come into direct contact with the water, ranging from partial submergence to the point of complete submergence, such as swimming, wading, and hand wetting. The use is

such that ingestion of the water is likely to occur and certain sensitive body organs, such as the eyes, ears or nose, may be exposed to direct contact with the water. Where the FBC use designation applies, the open water shall be free from algae in concentrations causing a nuisance condition or causing gastrointestinal or skin disorders. Standards specific to the use are presented in Appendix A.

F. Partial Body Contact (PBC). Partial body contact means the use of a stream reach, spring, reservoir, and other water body in which contact with the water may, but need not, occur and in which the probability of ingesting water is minimal; examples are fishing and boating. Where the PBC use applies, the open water shall be free from algae in concentrations causing a nuisance condition or causing gastrointestinal or skin disorders. Standards specific to the use are presented in Appendix A.

G. Agricultural Irrigation (AgI) and Agricultural Livestock Watering (AgL). Agricultural irrigation means the use of surface waters for irrigation of crops. Agricultural livestock watering means the use of surface waters as a supply for water consumption by livestock. Standards specific to the uses are presented in Appendix A.

H. Fish Consumption (FC). Fish consumption is the use of a surface water by humans for harvesting aquatic organisms for consumption. Harvestable aquatic organisms include, but are not limited to, fish, freshwater clams and crayfish, turtles, and frogs. Standards specific to the use are listed in Appendix A.

J. Groundwater Recharge (GWR). Groundwater recharge use means any surface water that recharges an aquifer. Surface waters designated as groundwater recharge must meet the standards for the aquifer being recharged as well as the surface water standards.

K. Domestic Water Source (DWS). Domestic water source use means the use of a surface or groundwater as a potable water supply. The general standards in Chapter 3 and Appendix A apply.

Chapter 5. Designated Uses for Water Bodies of the Hopi Reservation

Section 5.101 Streams

The uses are listed below for all perennial, intermittent and ephemeral streams that pass through the Hopi Reservation, including all tributaries, branches, springs, standing waters, and wetlands thereof:

Name	Designated Use
Dinnebito Wash	$A\&W_w$, FBC, PBC, AgL, AgI, GWR
Jeddito Wash	$A\&W_w$, FBC, PBC, AgL, AgI, GWR
Moencopi Wash	$A\&W_w$, FBC, PBC, AgL, AgI, GWR
Oraibi Wash	$A\&W_w$, FBC, PBC, AgL, AgI, GWR
Polacca Wash	$A\&W_w$, FBC, PBC, AgL, AgI, GWR
Wepo Wash	$A\&W_w$, FBC, PBC, AgL, AgI, GWR
All other streams	$A\&W_w$, FBC, PBC, AgL, AgI, GWR

Note: Ephemeral tributaries of these streams shall meet $A\&W_e$, PBC, AgL, AgI, and GWR use designations.

Section 5.102 Lakes

The uses are listed below for lakes and reservoirs on the Hopi Reservation:

Name	Designated Use
Keams Canyon (Beaver Dam)	$A\&W_w$, FBC, PBC, AgI, FC
Middle Reservoir	$A\&W_w$, FBC, PBC, AgI
Pasture Canyon Reservoir	$A\&W_w$, FBC, PBC, AgI, FC
Tuvi Reservoir	$A\&W_w$, FBC, PBC, AgI
All other lakes and reservoirs	$A\&W_w$, FBC, PBC, AgI

Section 5.103 Springs

The uses are listed below for springs on the Hopi Reservation:

Name	Designated Use
Augba Spring (Akpi)	$A\&W_w$, FBC, PBC, DWS, PCC
Bacavi Spring	$A\&W_w$, FBC, PBC, DWS, PCC, AgI
Blue Canyon	$A\&W_w$, FBC, PBC
Burro Spring-North	$A\&W_w$, FBC, PBC, AgL
Burro Spring-South	$A\&W_w$, FBC, PBC, AgL
Comar Spring	$A\&W_w$, FBC, PBC, AgL
Coyote Spring	$A\&W_w$, FBC, PBC, AgI, AgL
Drag Spring	$A\&W_w$, FBC, PBC
Flute Spring	$A\&W_w$, FBC, PBC, PCC
Honie Spring	$A\&W_w$, FBC, PBC, DWS, PCC, AgL
Hotevilla Spring	$A\&W_w$, FBC, PBC, DWS, PCC, AgI
Kalbito	$A\&W_w$, FBC, PBC
Keams Canyon Source Springs	$A\&W_w$, FBC, PBC, AgI
Keams Canyon Springs	$A\&W_w$, FBC, PBC, DWS
Little Burro Spring	$A\&W_w$, FBC, PBC, AgL
Little Field Spring	$A\&W_w$, FBC, PBC, AgI
Lamova (Lavavi)	$A\&W_w$, FBC, PBC, PCC, AgI
Moencopi Spring	$A\&W_w$, FBC, PBC, DWS, PCC
Nee De Mise Betoh	$A\&W_w$, FBC, PBC, AgL
Polacca Spring	$A\&W_w$, FBC, PBC, AgI, AgL
Redrock Spring Well	$A\&W_w$, FBC, PBC, DWS, PCC, AgL
Rock Ledge Spring	$A\&W_w$, FBC, PBC, AgL
Sand Spring	$A\&W_w$, FBC, PBC, AgL
Sand Springs-North	$A\&W_w$, FBC, PBC, DWS, AgL
Sand Springs-South	$A\&W_w$, FBC, PBC, AgL
Shonto Spring	$A\&W_w$, FBC, PBC, AgL
Shonto Well Spring	$A\&W_w$, FBC, PBC, AgL
Side Rock Well Spring	$A\&W_w$, FBC, PBC, AgL
Snowbird Spring	$A\&W_w$, FBC, PBC, AgL
Sweet Water Spring	$A\&W_w$, FBC, PBC, AgL

Name	Designated Use
Tepva Spring	$A\&W_w$, FBC, PBC, AgI, AgL
Wepo Spring No. 1	$A\&W_w$, FBC, PBC, AgI, AgL
Wepo Spring No. 2	$A\&W_w$, FBC, PBC, AgI
Whisky Spring	$A\&W_w$, FBC, PBC, AgL

All springs not included on this list shall be protected for the following uses: $A\&W_w$, FBC, PBC, AgL.

Note: FC criteria apply to all streams, lakes, and springs where $A\&W_w$ is designated.

Section 5.104 Groundwater

The uses are listed below for groundwater on the Hopi Reservation.

Name	Designated Use
N-aquifer	DWS, AgI, AgL
All other aquifers	AgI, AgL

Chapter 6. Sampling and Analyses

Section 6.101 Methodology

Sample collection, preservation, and analysis used to determine water quality and to maintain the standards set forth in Chapters 3 and 4 of these Water Quality Standards shall be performed in accordance with procedures prescribed by the latest EPA authoritative analytical reference, including but not limited to the latest editions of any of the following authorities:

- American Public Health Association, Standard Methods for the Examination of Water and Wastewater
- Environmental Monitoring and Support Laboratory, Methods for Chemical Analysis of Water and Wastes (U.S. Environmental Protection Agency Office of Research and Development, Cincinnati, Ohio, 1983)
- U.S. Environmental Protection Agency, Guidelines Establishing Test Procedures for the Analysis of Pollutants (40 CFR Part 136)
- The Hopi Tribe Quality Assurance Project Plan for Water Quality Monitoring, 2000 and any updated versions

Section 6.102 Bacteriological Surveys

When a minimum of five samples are collected in a 30-day period, the monthly geometric mean is used in assessing attainment of standards. When less than five samples are collected in a 30-day period, no single sample shall exceed the applicable upper limit for bacterial density set forth in Chapter 4.

Section 6.103 Sampling Procedures

A. Streams: Stream monitoring stations below waste discharges shall be located a sufficient distance downstream to ensure adequate vertical and lateral mixing.
B. Reservoirs: Sampling stations in reservoirs shall be located where the attainment of a water quality standard is to be assessed, but at least 250 feet from a waste discharge. Water quality measurements shall be taken at depth intervals in the water column at a sampling station. For toxic substances and nutrients, the entire water column shall be monitored. For dissolved oxygen in stratified lakes, measurements shall be made in the epilimnion. In nonstratified lakes measurements shall be made at intervals throughout the entire water column.
C. Biological Surveys: Any biological assessment program shall be established in accordance with EPA's *Rapid Bioassessment Protocols for Use in Streams and Wadeable Rivers: Periphyton, Benthic Macroinvertebrates, and Fish* (EPA-841-B-99-002) or other established procedures. As needed, artificial collection sites shall be installed in lowland streambeds to determine potential species diversity under improved stream conditions.

Chapter 7. Unique Waters

Section 7.101 Designation and Classification

A. The designation and classification of a Hopi surface water as a unique water shall be by rule.
B. To maintain and protect existing water quality in a unique water, the Tribal Council may adopt, by rule, site-specific water quality standards.
C. Any person may nominate a Hopi surface water for classification as a unique water by filing a petition for rule adoption with the Hopi Tribe Water Resources Program. A petition for rule adoption to classify a Hopi surface water as a unique water shall include:
    1. A map and a description of the water

2. A written statement in support of the nomination, including specific reference to the applicable criteria for unique waters classification as prescribed in Subsection D of this section
3. Supporting evidence demonstrating that one or more of the applicable unique waters criteria prescribed in Subsection D of this section has been met
4. Relevant water quality data

D. A Hopi surface or groundwater may be classified as a unique water by the Water Resources Program after a public hearing and upon a finding that the water is an outstanding tribal resource water based upon one of the following criteria:
   1. The water is of exceptional recreational, traditional, or ecological significance because of its unique attributes, including but not limited to attributes related to the geology, flora, fauna, water quality, aesthetic values, or the wilderness characteristics of the water.
   2. Threatened or endangered species are known to be associated with the water and the existing water quality is essential to the maintenance and propagation of a threatened or endangered species, or the water provides critical habitat for a threatened or endangered species. Threatened or endangered species are identified on the following lists which are hereby incorporated by reference and are on file with the Office of the Secretary of State of Arizona and with the Arizona Department of Environmental Quality:
      a. *Endangered and Threatened Wildlife and Plants*, 50 CFR, §§ 17.11 and 17.12 (revised as of October 1, 2006)
      b. *Species of Greatest Conservation Need*, Arizona Game and Fish Department (November 12, 2006)
      c. List of highly safeguarded protected native plants prescribed in Arizona Administrative Code (A.A.C.) 3.A.A.C.3, Article 11, Appendix A (A) (December 31, 2006)
      d. List of Migratory Birds, 50 CFR §10.13 (October 1, 2005)
      e. *Federally Listed Threatened and Endangered Species of Arizona*, U.S. Fish & Wildlife Service (June 6, 1995)

E. The following Hopi surface waters are hereby classified as unique waters:
   In the Moencopi Wash watershed, from Blue Canyon Springs to the confluence of Begashibito Wash.

F. The following Hopi groundwaters are classified as unique waters:

The N-aquifer and all areas recharging the N-aquifer. The N-aquifer includes water-bearing units of the Navajo Sandstone, the Kayenta Formation, the Wingate Sandstone, and all springs emanating from these units.

G. The following water quality standards apply to the listed unique waters. Water quality standards prescribed in this subsection, supplement or supersede the water quality standards prescribed in Chapters 3 and 4.

Parameter	Standard
pH	no change due to discharge
Temperature	no increase due to discharge
Dissolved oxygen	no decrease due to discharge
Total dissolved solids	no increase due to discharge

Chapter 8. Definitions

Unless otherwise provided, or unless the context requires another definition, the definitions set forth in this chapter shall apply to the terms used throughout Title II, "Water Quality Standards."

Acute Toxicity: Toxicity that exerts short-term lethal impacts on representative organisms with a duration of exposure generally less than or equal to 48 hours. Acute toxicity shall be determined in accordance with procedures specified in EPA 821/R-02-012, *Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms*. Other methods may be used as appropriate to determine acute effects other than lethality such as, but not limited to, behavioral changes or immobilization.

Agricultural irrigation: The use of a water for the irrigation of crops.

Agricultural livestock watering: The use of a water for consumption by livestock.

Algae: Simple plants without roots, stems, or leaves that contain chlorophyll and are capable of photosynthesis.

Antidegradation: The policy set forth in U.S. Environmental Protection Agency Water Quality Standards Regulations under the Clean Water Act whereby existing uses and the level of water quality necessary to maintain those uses is maintained and protected (see 40 CFR Section 131.12 (1987)).

Aquifer: A saturated permeable geologic unit that can transmit significant quantities of water under ordinary hydraulic gradients.

Aquatic and wildlife (ephemeral): The use of an ephemeral water by animals, plants, or other organisms, excluding fish, for habitation, growth, or propagation.

Aquatic and wildlife (warm water habitat): The use of a water by animals, plants, or other organisms, excluding salmonids, for habitation, growth, or propagation.

Aquatic biota: Animal and plant life in the water.

Attainable use: A use of a surface or groundwater body that has the level of water quality and other characteristics that are needed to support the use, or which would have the level of water quality and other characteristics needed to support the use upon implementation of and compliance with the pertinent narrative and numeric standards in the Hopi Water Quality Standards.

Best management practices: Practices undertaken to control, restrict, and diminish nonpoint sources of pollution that are consistent with the purposes of the Hopi Water Quality Standards and with the narrative and numeric standards contained therein; BMPs include, but are not limited to structural and nonstructural controls, changes in management practices, and operation and maintenance procedures. BMPs can be applied before, during, and after pollution-producing activities to reduce or eliminate the introduction of pollutants into receiving waters.

Carcinogenic: Cancer producing.

Chronic toxicity: Toxicity that exerts sublethal negative effects such as impairment of growth or reproduction, or which becomes lethal after long-term exposure, generally measured in a 7-day test on representative sensitive organisms. Chronic toxicity shall be determined in accordance

with procedures specified in EPA 821/R-02-013, *Short-Term Methods for Estimating the Chronic Toxicity of Effluents to Receiving Waters and Freshwater Organisms*. Other methods may be used as appropriated.

Clean Water Act: The Federal Water Pollution Control Act, as amended by the Water Quality Act of 1987 (and all future amendments), which is incorporated by reference and is on file with the Hopi Water Resources Program.

Color: True color as well as apparent color. True color is the color of the water from which turbidity has been removed. Apparent color includes not only the color due to substances in solution (true color), but also that color due to suspended matter.

Criteria: Elements of water quality standards that are expressed as pollutant concentrations or levels, or narrative statements representing a water quality that supports a designated use.

Cumulative: Increasing by successive additions.

Designated uses: Those uses set forth in the water quality standards herein.

Dissolved constituents: Chemical constituents that pass through a filter with pores averaging 0.45 microns in diameter, under a pressure differential not exceeding one atmosphere.

Dissolved oxygen: The amount of oxygen dissolved in water or the amount of oxygen available for biochemical activity in water, commonly expressed as a concentration in milligrams per liter.

Domestic water source: The use of a water as a potable water supply. Coagulation, sedimentation, filtration, disinfection, or other treatments may be necessary to yield a finished water suitable for human consumption. This also applies to small water sources not normally covered under the provisions of the Safe Drinking Water Act.

E. coli: Escherichia coli bacteria.

Effluent: Discharge into surface waters from other than natural sources.

Effluent-dominated water: A navigable water that consists primarily of discharges of treated wastewater and that has been classified as an effluent-dominated water by the Tribal Council.

Ephemeral stream: A stream or reach that flows briefly only in direct response to precipitation or snowmelt in the immediate locality, the channel bed of which is always above the water table in the surrounding area.

Epilimnion: The layer of water that overlies the thermocline of a lake and that is subject to the action of wind.

Eutrophication: The maturation of a body of water, involving increasing concentrations of dissolved nutrients and seasonal oxygen deficiency.

Existing uses: Those uses actually attained in a surface water body on or after November 28, 1975, whether or not they are referred to in the Hopi Water Quality Standards, or a use that the existing water quality will allow.

FDA action levels: Levels promulgated by the U.S. Food and Drug Administration (FDA) concerning concentrations of substances in food.

Fecal coliform bacteria: Gram negative, non-spore-forming rod-shaped bacteria that are present in the gut or the feces of warm-blooded animals. Fecal coliform bacteria generally include organisms that are capable of producing gas from lactose broth in a suitable culture medium within 24 hours at 44.5 ± 0.2ºC.

Fish consumption: The use of a surface water by humans for harvesting aquatic organisms for consumption. Harvestable aquatic organisms include, but are not limited to, fish, turtles, and frogs.

Full body contact: The use of a surface water that causes the human body to come into direct contact with the water, ranging from partial submergence to the point of complete submergence, such as swimming, wading, hand wetting. The use is such that ingestion of the water is likely to occur and certain sensitive body organs, such as the eyes, ears, or nose, may be exposed to direct contact with the water.

Geometric mean: The antilog of the log of a set of numbers. The geometric mean is calculated using the following formula.

$$GMy = \sqrt[n]{(Y_1)(Y_2)(Y_3)\ldots(Y_n)}$$

Groundwater: Subsurface water occurring under either saturated or unsaturated conditions.

Groundwater recharge: The use of a surface water as a source of recharge to an aquifer.

Hardness: The sum of the calcium and magnesium concentrations, expressed as calcium carbonate ($CaCO_3$) in milligrams per liter.

Hopi surface waters: The surface waters of the Hopi Reservation. Referred to as "navigable waters" in U.S. Environmental Protection Agency documents.

Indigenous: Produced, growing, or living naturally in a particular region or environment.

Intermittent stream: A stream or reach of a stream that flows only at certain times of the year, when receiving flow from springs, melting snow, or localized precipitation.

LC_{50}: The concentration of a substance that is lethal to 50 percent of the test organisms within a defined time period.

Micrograms per liter (µg/L): The concentration at which one microgram is contained in a volume of one liter; one microgram per liter is equivalent to one part per billion (ppb) at unit density.

Milligrams per liter (mg/L): The concentration at which one milligram is contained in a volume of one liter; one milligram per liter is equivalent to one part per million (ppm) at unit density.

Mixing zone: A three-dimensional zone in which discharged effluent mixes with the receiving water and within which there is a gradation of water quality.

N-aquifer: Water-bearing units of the Navajo Sandstone, Wingate Sandstone, and Kayenta Formation.

Narrative standard: A standard or criterion expressed in words rather than numerically.

National Pollutant Discharge Elimination System: The point source discharge permit program established by Section 402 of the Clean Water Act.

Natural conditions: Characteristics that are not man-induced that are related to water quality; the levels of pollutants present in ambient water that are from natural, as opposed to man-induced, sources.

Nonpoint source: A source of pollution that is not a discernible, confined, and discrete conveyance; a diffuse source that flows across natural or man-made surfaces, such as run-off from agricultural, construction, mining, or silvicultural activities, or from urban areas.

Nuisance condition: A condition involving uncontrolled growth of aquatic plants, usually caused by excessive nutrients in the water.

Nutrient: A chemical element or inorganic compound taken in by green plants and used in organic synthesis.

Oil: Petroleum in any form, including but not limited to crude oil, gasoline, kerosene, fuel oil, diesel oil, lubricating oil, or sludge.

Partial body contact use: The use of a surface water that may cause the human body to come into direct contact with the water, but normally not to the point of complete submergence. The use is such that ingestion of the water is not likely to occur, nor will sensitive body organs such as the eyes, ears, or nose normally be exposed to direct contact with the water; examples are fishing and boating.

Perennial stream: A stream or reach of a stream that flows continuously throughout the year, the upper surface of which is generally lower than the water table of the region adjoining the stream.

Persistent: Resistant to degradation or change.

pH: The negative logarithm of the effective hydrogen-ion concentration in gram equivalents per liter; a measure of the acidity or alkalinity of a solution, increasing with increasing alkalinity and decreasing with increasing acidity.

Picocurie (pCi): That quantity of radioactive material producing 2.22 nuclear transformations per minute.

Point source: Any discernible, confined, and discrete conveyance from which pollutants are or may be discharged into a water body; does not include return flows from irrigated agriculture.

Primary contact ceremonial use: The use of a stream, spring, reservoir, impoundment, or other water body for religious or traditional purposes by members of the Hopi Tribe; such use involves immersion, and intentional or accidental ingestion of water, and it requires protection of sensitive and valuable aquatic life and riparian habitat.

Recreational uses: The full body contact and partial body contact designated uses.

Segment: A water quality standards segment, the surface waters of which have common hydrologic characteristics or flow regulation regimes, possess common natural physical, chemical, and biological characteristics, and exhibit common reactions to external stresses, such as the discharge of pollutants.

Synergism: Cooperative action of discrete agents such that the total effect is greater than the sum of the effects taken independently.

Technology-based effluent limitations: The application of technology-based effluent limitations as required under Section 301(b) of the Clean Water Act.

Thermal Stratification: Horizontal layers of different densities produced in a lake and caused by temperature.

Total phosphorus: All the phosphorus present in the sample, regardless of form, as measured by a persulfate digestion procedure.

Total recoverable constituent: The concentration of a constituent as measured under standard laboratory methods; for example, where an unfiltered sample of water is brought to about 0.3 molar in HCl by adding purified acid and the mixture is held just below the boiling point for approximately 30 minutes, after which time the filtrate is analyzed for metals.

Toxic substances: Those pollutants, or combination of pollutants, which after discharge and upon exposure, ingestion, inhalation, or assimilation into any organism, either directly from the environment or indirectly by ingestion through food chains, may cause death, disease, behavioral abnormalities, cancer, genetic mutations, physiological malfunctions (including malfunctions in reproduction), or physical deformations in such organisms or their offspring.

Toxicity: State or degree of being toxic or poisonous; producing lethal or sublethal adverse effects on representative sensitive organisms, due to exposure to toxic materials.

Turbidity: A measure of the amount of suspended material, particles, or sediment that has the potential for adverse impacts on aquatic biota.

Unique water: A Hopi water that has been classified as an outstanding natural resource water by the Tribal Council.

Use-attainability analysis: A structured scientific assessment of the factors affecting attainment of a use for a body of water, such assessment may include physical, chemical, biological, and economic factors, such as those referred to in 40 CFR Section 131.10(g), and guidance for which may be found in U.S. Environmental Protection Agency, *Technical Support Manual: Waterbody Surveys and Assessments for Conducting Use-Attainability Analyses* (Volume 1 - Streams; Volume 2 - Estuarine Systems; Volume 3 - Lake Systems).

Warm water habitat: A stream reach, lake, or impoundment in which water temperature and other characteristics are suitable for support and propagation of warm water fish such as large-mouth black bass, small-mouth black bass, crappie, white bass, bluegill, flathead catfish, channel catfish, white sucker, flathead chub, and flathead minnow.

Water quality-based controls: Effluent limitations, as provided under Section 301(b)(1)(C) of the Clean Water Act, which are developed and imposed on point-source discharges in order to protect and maintain applicable water quality standards. These controls are more stringent than the technology-based effluent limitations required under other paragraphs of Section 301(b).

Wetlands: Those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands include swamps, marshes, bogs, cienegas, tinajas, and similar areas.

Zone of passage: The portion of the receiving water outside the mixing zone (where water quality throughout is the same as that of the receiving water).

Table A-1. Numeric Criteria

Constituent/Parameter	Numeric Criteria (mg/L unless otherwise noted)								
	Aquatic and Wildlife		Fish Consumption	Domestic Water Source (DWS) and Groundwater Recharge (GWR)	Primary Contact Ceremonial (PCC)	Agricultural Irrigation (AgI)	Agricultural Livestock Watering (AgL)	Full Body Contact (FBC)	Partial Body Contact (PBC)
	Warmwater Habitat ($A\&W_w$)	Ephemeral ($A\&W_e$)							
Dissolved oxygen	≥5.0 [a]	≥5.0 [a]							
Temperature (°C)	≤32.2	≤32.2				≤2.7° increase from monthly maximum	≤2.7° increase from monthly maximum	≤2.7° increase from monthly maximum	≤2.7° increase from monthly maximum
Total ammonia (as N)	See Table A-4	See Table A-4							
Chloride	230	230		250	250			250	
pH range	6.0-9.0	6.0-9.0		5.0-9.0	6.5-9.0 [b]	4.5-9.0	6.5-9.0	6.5-9.0 [b]	6.5-9.0 [b]
Sulfate	250	250	250	250	250			250	
Total dissolved solids	500	500	500	500	500			500	
Total trihalomethanes				0.10	0.10			0.10	
Dissolved aluminum						5.0	5.0		
Dissolved cobalt						0.05	1.0		
Dissolved lithium						2.5			
Dissolved molybdenum						0.01			
Dissolved vanadium						0.1	0.1		0.1
Electrical conductivity (µmhos/cm)	Variable [c]	Variable [c]	Variable [c]	Variable [c]	Variable [c]	Variable [c]	Variable [c]	Variable [c]	Variable [c]
Turbidity (NTU)	Variable [d]	Variable [d]		25	25			25	
E. coli (colonies/100 mL) (geometric mean maximum)				Variable [e]	Variable [e]			Variable [e]	Variable [e]
Fecal coliforms (colonies/100 mL)				Variable [f]	Variable [f]			Variable [f]	Variable [f]
Radioactive Contaminants									
Gross alpha (pCi/L) excluding Rn and U			15	15	15	15	15	15	15
Gross beta (pCi/L)			50	50	50			50	50
Gross beta and photon emitters (mrem/yr) from manmade radionuclides				Variable [g]	Variable [g]			Variable [g]	Variable [g]
Radium-226 + radium-228 (pCi/L)			5.0	5.0	5	30	30	5.0	5.0
Strontium-90 (pCi/L)			8.0	8.0	8.0	8.0	8.0	8.0	8.0
Tritium (pCi/L)			20,000	20,000	20,000	20,000	20,000	20,000	20,000

[a] If the dissolved oxygen (mg/L) of a surface water is less than the water quality standard for dissolved oxygen, but the percent saturation of oxygen is equal to or greater than 90%, then the surface water shall be deemed to be in compliance with the water quality standard for dissolved oxygen.

[b] The maximum change due to discharge shall be ≤0.5 pH units.

[c] ≤⅓ increase over naturally occurring levels.

[d] ≤50 NTU for rivers, streams, or other flowing waters; ≤25 NTU for lakes, reservoirs, and ponds.

[e] Escherichia coli (E. coli) shall not exceed a monthly geometric mean of 130/100 mL based upon a minimum of no fewer than five samples collected over a period of not more than 30 days. The single sample maximum is 580/100 mL. Compliance shall be based upon meeting the analytical requirements of 40 CFR Part 136 or other approved methods.

[f] Compliance shall be based upon meeting the following requirements for coliform bacteria. The bacteria of the fecal coliform group shall not exceed a monthly geometric mean of 1,000/100 mL, as determined by multiple-tube fermentation or membrane filter procedures based on a minimum of not less than five samples collected over a period of not more than 30 days. Further, in no more than 10% of the total samples during any 30-day period shall the bacteria of the fecal coliform group exceed 2,000/100 mL. The single sample maximum is 4,000/100 mL.

[g] Average annual concentration shall not produce an annual dose equivalent to the total body or any internal organ greater than 4 millirem per year; examples are tritium: 20,000 pCi/L = 4 mrem/yr; strontium-90: 8 pCi/L = 4 mrem/yr

Table A-2. Numeric Criteria for Toxic Constituents

Parameter	CAS[a] Number	Numeric Standard[b] (µg/L unless otherwise noted)									
		DWS + FC, GWR, PCC	FC	FBC	PBC	AgI	AgL	$A\&W_w$		$A\&W_e$	
								Acute	Chronic	Acute	Chronic
Acenaphthene	83-32-9	670	990	56,000	56,000	NNS	NNS	850	550	NNS	NNS
Acenaphthylene	208-96-8	NNS	NNS	NNS	NNS	NNS	NNS	NNS	NNS	NNS	NNS
Acrolein	107-02-8	190	290	470	470	NNS	NNS	34	30	NNS	NNS
Acrylonitrile	107-13-1	0.051	0.25	9.0	9330	NNS	NNS	3800	250	NNS	NNS
Alachlor	15972-60-8	2.0	NNS	9330	9330	NNS	NNS	2500	170	NNS	NNS
Aldrin	309-00-2	0.000049	0.00005	0.3	30	0.003[c]	0.003[c]	3.0	NNS	4.5	NNS
Ammonia	7664-41-7	NNS	NNS	NNS	NNS	NNS	NNS	Tbl A-3a[d]	Tbl A-3b[d]	NNS	NNS
Anthracene	120-12-7	8,300	40,000	280,000	280,000	NNS	NNS	NNS	NNS	NNS	NNS
Antimony (as Sb)	7440-36-0	5.6 T	640	370 T	370 T	NNS	NNS	88 D	30 D	NNS	NNS
Arsenic (as As)	7440-38-2	10 T	10	30 T	280 T	2000 T	200 T	340 D	150 D	440 D	230 D
Asbestos	1332-21-4	7,000,000 fibers/L[e]	NNS	NNS	NNS	NNS	NNS	NNS	NNS	NNS	NNS
Atrazine	1912-24-9	3.0	NNS	32,670	32,670	NNS	NNS	NNS	NNS	NNS	NNS
Barium (as Ba)	7440-39-3	2000 T	NNS	186,670 T	186,670 T	NNS	NNS	NNS	NNS	NNS	NNS
Benzene	71-43-2	2.2	51	130	3730	NNS	NNS	2700	180	NNS	NNS
Benzidine	92-87-5	0.000086	0.0002	0.02	2800	0.01	0.01	1300	89	10,000	640
Benzo (a) anthracene	56-55-3	0.0038	0.018	1.0	NNS	NNS	NNS	NNS	NNS	NNS	NNS
Benzo (a) pyrene	50-32-8	0.0038	0.018	1.0	NNS	NNS	NNS	NNS	NNS	NNS	NNS
Benzo (b) fluoranthene	205-99-2	0.0038	0.018	0.12	NNS	NNS	NNS	NNS	NNS	NNS	NNS
Benzo (ghi) perylene	191-24-2	NNS	NNS	NNS	NNS	NNS	NNS	NNS	NNS	NNS	NNS
Benzo (k) fluoranthene	207-08-9	0.0038	0.018	1.0	NNS	NNS	NNS	NNS	NNS	NNS	NNS

Note: All numeric standards not otherwise indicated are total recoverable values (for historic reasons some numeric standards are marked redundantly as total recoverable).

[a] Chemical Abstract System (CAS) number is a unique identification number given to each chemical.

[b] The numeric standards to protect these uses shall not be exceeded.

[c] The standard to protect this use is 0.003 µg/L aldrin/dieldrin

[d] Values for ammonia are contained in Table A-3

[e] The standard to protect this use is 7 million fibers (longer than 10 micrometers) per liter.

[f] Numeric criterion calculated as detailed in Table A-4.

[g] This criterion applies to DDT and its metabolites (i.e. the total concentration of DDT and its metabolites should not exceed this value)

µg/L =Micrograms per liter
NNS =No numeric standard
D =Dissolved
T =Total recoverable
TTHM =The chemical is a trihalomethane. See Trihalomethanes, Total for DWS standard.
Acute =Acute Toxicity
Chronic =Chronic Toxicity
$A\&W_e$ =Aquatic and Wildlife (Ephemeral)

DWS =Domestic Water Source
GWR =Groundwater Recharge
PCC =Primary Contact Ceremonial
FC =Fish Consumption
FBC =Full Body Contact
PBC =Partial Body Contact
AgI =Agricultural Irrigation
AgL =Agricultural Livestock Watering
$A\&W_w$ =Aquatic and Wildlife (Warm Water Habitat)

Table A-2. Numeric Criteria for Toxic Constituents

Parameter	CAS [a] Number	Numeric Standard [b] (µg/L unless otherwise noted)									
		DWS + FC, GWR, PCC	FC	FBC	PBC	AgI	AgL	$A\&W_w$		$A\&W_e$	
								Acute	Chronic	Acute	Chronic
Beryllium (as Be)	7440-41-7	4 T	85	1870 T	1870 T	NNS	NNS	NNS	NNS	NNS	NNS
Bis (2-chloroethoxy) methane	111-91-1	NNS	NNS	NNS	NNS	NNS	NNS	NNS	NNS	NNS	NNS
Bis (2-chloroethyl) ether	111-44-4	0.03	0.53	4.0	NNS	NNS	NNS	120,000	6700	NNS	NNS
Bis (2-chloroisopropyl) ether	108-60-1	1400	65,000	NNS	NNS	NNS	NNS	NNS	NNS	NNS	NNS
Bis (chloromethyl) ether	542-88-1	0.0001	0.00029	NNS	NNS	NNS	NNS	NNS	NNS	NNS	NNS
Bis (2-Ethylhexyl) Phthalate	117-81-7	1.2	2.2	330	18,670	NNS	NNS	400	360	3100	360
Boron (as B)	7440-42-8	1400 T	NNS	186,670	186,670	1000 T	NNS	NNS	NNS	NNS	NNS
p-Bromodiphenyl ether	101-55-3	NNS	NNS	NNS	NNS	NNS	NNS	180	14	NNS	NNS
Bromoform	75-25-2	4.3	140	186,670	186,670	NNS	NNS	15,000	10,000	NNS	NNS
Butyl benzyl phthalate	85-68-7	1500	1900	186,670	186,670	NNS	NNS	1700	130	NNS	NNS
Cadmium (as Cd)	7440-43-9	5 T	8.0	470 T	470 T	50	50	Tbl A-4[f]	Tbl A-4[f]	Tbl A-4[f]	Tbl A-4[f]
Carbofuran	1563-66-2	40	NNS	4670	4670	NNS	NNS	650	50	NNS	NNS
Carbon tetrachloride	56-23-5	0.23	1.6	40	650	NNS	NNS	18,000	1100	NNS	NNS
Chlordane	57-74-9	0.0008	0.00081	13	470	NNS	NNS	2.4	0.0043	3.2	0.45
Chlorine (total residual)	7782-50-5	4000	NNS	4000	4000	NNS	NNS	19	11	NNS	NNS
Chlorobenzene	108-90-7	130	1600	18,670	18,670	NNS	NNS	3800	260	NNS	NNS
p-Chloro-m-cresol	59-50-7	NNS	NNS	NNS	NNS	NNS	NNS	15	5	48000	15000
Chlorodibromomethane	124-48-1	0.4	13	18,670	18,670	NNS	NNS	NNS	NNS	NNS	NNS
Chloroethane	75-00-3	NNS	NNS	NNS	NNS	NNS	NNS	NNS	NNS	NNS	NNS
2-Chloroethyl vinyl ether	110-75-8	NNS	NNS	NNS	NNS	NNS	NNS	180,000	9800	NNS	NNS

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Acute =Acute Toxicity
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DWS =Domestic Water Source
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Table A-2. Numeric Criteria for Toxic Constituents

Parameter	CAS [a] Number	Numeric Standard [b] (µg/L unless otherwise noted)									
		DWS + FC, GWR, PCC	FC	FBC	PBC	AgI	AgL	$A\&W_w$		$A\&W_e$	
								Acute	Chronic	Acute	Chronic
Chloroform	67-66-3	5.7	470	230	14,000	NNS	NNS	14,000	900	NNS	NNS
Chloronaphthalene beta	91-58-7	1000	1600	74,670	74,670	NNS	NNS	NNS	NNS	NNS	NNS
2-Chlorophenol	95-57-8	81	150	4670	4670	NNS	NNS	2200	150	NNS	NNS
Chlorophenoxy Herbicide (2,4,5,-TP)	93-72-1	10	NNS	7470	7470	NNS	NNS	NNS	NNS	NNS	NNS
Chlorophenoxy Herbicide (2,4-D)	94-75-7	100	NNS	9330	9330	NNS	NNS	NNS	NNS	NNS	NNS
4-Chlorophenyl phenyl ether	7005-72-3	NNS	NNS	NNS	NNS	NNS	NNS	NNS	NNS	NNS	NNS
Chlorpyrifos	2921-88-2	20	NNS	2800	2800	NNS	NNS	0.083	0.041	NNS	NNS
Chromium (as Cr III)	16065-83-1	NNS	75,000	1,400,000	1,400,000	NNS	NNS	Tbl A-4[f]	Tbl A-4[f]	Tbl A-4[f]	Tbl A-4[f]
Chromium (as Cr VI)	18540-29-9	20 T	150 T	2800 T	2800 T	NNS	NNS	16 D	11 D	34 D	23 D
Chromium (Total as Cr)	7440-47-3	100 T	NNS	NNS	NNS	1000	1000	NNS	NNS	NNS	NNS
Chrysene	218-01-9	0.0038	0.018	1.0	NNS	NNS	NNS	NNS	NNS	NNS	NNS
Copper (as Cu)	7440-50-8	1300 T	NNS	9330 T	9330 T	5000 T	500 T	Tbl A-4[f]	Tbl A-4[f]	Tbl A-4[f]	Tbl A-4[f]
Cyanide	57-12-5	140	140	18,670 T	18,670 T	NNS	200 T	22	5.2	84 T	19 T
Dalapon	75-99-0	200	NNS	NNS	NNS	NNS	NNS	NNS	NNS	NNS	NNS
Demeton	8065-48-3	NNS	NNS	NNS	NNS	NNS	NNS	NNS	0.1	NNS	NNS
Diazinon	333-41-5	NNS	NNS	NNS	NNS	NNS	NNS	0.17	0.17	NNS	NNS
Dibenzo (ah) anthracene	53-70-3	0.0038	0.018	1.0	NNS	NNS	NNS	NNS	NNS	NNS	NNS
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	0.2	NNS	1870	1870	NNS	NNS	NNS	NNS	NNS	NNS
1,2-Dibromoethane (EDB)	106-93-4	0.05	NNS	8400	8400	NNS	NNS	NNS	NNS	NNS	NNS
Di-n-butyl phthalate	84-74-2	2000	4500	93,330	93,330	NNS	NNS	470	35	1100	84

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Parameter	CAS [a] Number	Numeric Standard [b] (µg/L unless otherwise noted)									
		DWS + FC, GWR, PCC	FC	FBC	PBC	AgI	AgL	$A\&W_w$		$A\&W_e$	
								Acute	Chronic	Acute	Chronic
1,2-Dichlorobenzene	95-50-1	420	1300	84,000	84,000	NNS	NNS	1200	470	5900	2300
1,3-Dichlorobenzene	541-73-1	320	960	NNS	NNS	NNS	NNS	2500	970	NNS	NNS
1,4-Dichlorobenzene	106-46-7	63	190	65,330	65,330	NNS	NNS	2000	780	6500	2500
3,3'-Dichlorobenzidine	91-94-1	0.021	0.028	10	NNS	NNS	NNS	NNS	NNS	NNS	NNS
Dichlorobromomethane	75-27-4	0.55	17	186,670	186,670	NNS	NNS	NNS	NNS	NNS	NNS
p,p'-Dichlorodiphenyltrichloroethane (DDT)	50-29-3	0.00022	0.00022	4.0	140	0.001	0.001	1.1 [g]	0.001 [g]	1.1 [g]	0.001 [g]
p,p'-Dichlorodiphenyldichloroethylene (DDE)	72-55-9	0.00022	0.00022	4.0	470	0.001	0.001				
p,p'-Dichlorodiphenyldichloroethane (DDD)	72-54-8	0.00031	0.00031	4.0	470	0.001	0.001				
1,1-Dichloroethane	75-34-3	NNS	NNS	NNS	NNS	NNS	NNS	NNS	NNS	NNS	NNS
1,2-Dichloroethane	107-06-2	0.38	37	50	186,670	NNS	NNS	59,000	41,000	NNS	NNS
1,1-Dichloroethylene	75-35-4	330	7100	46,670	46,670	NNS	NNS	15,000	950	NNS	NNS
1,2-cis-Dichloroethylene	156-59-2	70	NNS	NNS	NNS	NNS	NNS	NNS	NNS	NNS	NNS
1,2-trans-Dichloroethylene	156-60-5	100	10,130	18,670	18,670	NNS	NNS	68,000	3900	NNS	NNS
2,4-Dichlorophenol	120-83-2	77	290	2,800	2,800	NNS	NNS	1000	88	NNS	NNS
1,2-Dichloropropane	78-87-5	0.5	15	NNS	NNS	NNS	NNS	26,000	9200	NNS	NNS
1,3-Dichloropropene	542-75-6	0.34	21	90	28,000	NNS	NNS	3000	1100	NNS	NNS
Dieldrin	60-57-1	0.000052	0.000054	0.3	50	0.003 [c]	0.003 [c]	0.24	0.056	4	0.9
Diethyl phthalate	84-66-2	17,000	44,000	746,670	746,670	NNS	NNS	26,000	1600	NNS	NNS
Di(2-ethylhexyl) adipate	103-23-1	400	NNS	NNS	NNS	NNS	NNS	NNS	NNS	NNS	NNS
2,4-Dimethylphenol	105-67-9	380	850	18,670	18,670	NNS	NNS	1000	310	150,000	43,000

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Table A-2. Numeric Criteria for Toxic Constituents
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Parameter	CAS [a] Number	Numeric Standard [b] (µg/L unless otherwise noted)									
		DWS + FC, GWR, PCC	FC	FBC	PBC	AgI	AgL	$A\&W_w$		$A\&W_e$	
								Acute	Chronic	Acute	Chronic
Dimethyl phthalate	131-11-3	270,000	1,100,000	NNS	NNS	NNS	NNS	17,000	1000	NNS	NNS
4,6-Dinitro-o-cresol	534-52-1	13	280	NNS	NNS	NNS	NNS	310	24	NNS	NNS
2,4-Dinitrophenol	51-28-5	69	5300	1870	1870	NNS	NNS	110	9.0	NNS	NNS
Dinitrophenols	25550-58-7	69	5300	NNS	NNS	NNS	NNS	NNS	NNS	NNS	NNS
2,4-Dinitrotoluene	121-14-2	0.11	3.4	1870	1870	NNS	NNS	14,000	860	NNS	NNS
2,6-Dinitrotoluene	606-20-2	0.05	NNS	7.0	3730	NNS	NNS	NNS	NNS	NNS	NNS
Di-n-octyl phthalate	117-84-0	NNS	NNS	NNS	NNS	NNS	NNS	NNS	NNS	NNS	NNS
Dinoseb	88-85-7	7	NNS	NNS	NNS	NNS	NNS	NNS	NNS	NNS	NNS
1,2-Diphenylhydrazine	122-66-7	0.036	0.2	6	NNS	NNS	NNS	130	11	NNS	NNS
Diquat	85-00-7	20	NNS	2050	2050	NNS	NNS	NNS	NNS	NNS	NNS
Endosulfan (alpha)	959-98-8	62	89	NNS	NNS	NNS	NNS	0.22	0.056	3	1.5
Endosulfan (beta)	33213-65-9	62	89	NNS	NNS	NNS	NNS	0.22	0.056	3	1.5
Endosulfan sulfate	1031-07-8	62	89	5600	5600	NNS	NNS	0.22	0.06	3	1.5
Endothall	145-73-3	100	NNS	18,670	18,670	NNS	NNS	NNS	NNS	NNS	NNS
Endrin	72-20-8	0.059	0.06	280	280	0.004	0.004	0.086	0.036	0.7	0.3
Endrin aldehyde	7421-93-3	0.29	0.3	NNS	NNS	NNS	NNS	0.09	0.04	0.7	0.3
Ethylbenzene	100-41-4	530	2100	93,330	93,330	NNS	NNS	23,000	1400	NNS	NNS
Ethylene dibromide	106-34-4	0.05	NNS	NNS	NNS	NNS	NNS	NNS	NNS	NNS	NNS
Fluoranthene	206-44-0	130	140	37,330	37,330	NNS	NNS	2000	1600	NNS	NNS
Fluorene	86-73-7	1100	5300	37,330	37,330	NNS	NNS	NNS	NNS	NNS	NNS

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Table A-2. Numeric Criteria for Toxic Constituents
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Parameter	CAS [a] Number	Numeric Standard [b] (µg/L unless otherwise noted)									
		DWS + FC, GWR, PCC	FC	FBC	PBC	AgI	AgL	$A\&W_w$		$A\&W_e$	
								Acute	Chronic	Acute	Chronic
Fluoride	7782-41-4	4000	NNS	56,000	56,000	NNS	NNS	NNS	NNS	NNS	NNS
Glyphosate	1071-83-6	700	NNS	93,330	93,330	NNS	NNS	NNS	NNS	NNS	NNS
Guthion	86-50-0	NNS	NNS	NNS	NNS	NNS	NNS	NNS	0.01	NNS	NNS
Heptachlor	76-44-8	0.000079	0.000079	1.0	470	NNS	NNS	0.52	0.0038	0.9	0.1
Heptachlor Epoxide	1024-57-3	0.000039	0.000039	1.0	12	NNS	NNS	0.52	0.0038	0.9	0.1
Hexachlorobenzene	118-74-1	0.00028	0.00029	3.0	750	NNS	NNS	6.0	4.0	NNS	NNS
Hexachlorobutadiene	87-68-3	0.44	18	60	190	NNS	NNS	45	8.0	NNS	NNS
Hexachlorocyclohexane alpha	319-84-6	0.0026	0.0049	1.0	7470	NNS	NNS	1600	130	1600	130
Hexachlorocyclohexane beta	319-85-7	0.0091	0.017	3.0	560	NNS	NNS	1600	130	1600	130
Hexachlorocyclohexane delta	319-86-8	0.0123	0.0414	NNS	NNS	NNS	NNS	1600	130	1600	130
Hexachlorocyclohexane gamma (lindane)	58-89-9	0.98	1.8	280	280	NNS	NNS	0.95	NNS	11	0.9
Hexachlorocyclopentadiene	77-47-4	40	1100	5600	5600	NNS	NNS	3.5	0.3	NNS	NNS
Hexachloroethane	67-72-1	1.4	3.3	330	930	NNS	NNS	490	350	850	610
Hydrogen Sulfide	7783-06-4	NNS	NNS	NNS	NNS	NNS	NNS	NNS	2	NNS	NNS
Iron	7439-89-6	300	NNS	NNS	NNS	NNS	NNS	NNS	1000	NNS	NNS
Indeno (1,2,3-cd) pyrene	193-39-5	0.0038	0.018	0.12	NNS	NNS	NNS	NNS	NNS	NNS	NNS
Isophorone	78-59-1	35	960	4910	186,670	NNS	NNS	59,000	43,000	NNS	NNS
Lead (as Pb)	7439-97-1	15 T	NNS	15 T	15 T	10000 T	100 T	Tbl A-4[f]	Tbl A-4[f]	Tbl A-4[f]	Tbl A-4[f]
Malathion	121-75-5	140	NNS	18,670	18,670	NNS	NNS	NNS	0.1	NNS	NNS
Manganese (as Mn)	7439-96-5	50 T	100	130,670	130,670	10,000	NNS	NNS	NNS	NNS	NNS

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								Acute	Chronic	Acute	Chronic
Mercury (as Hg)	7439-97-6	2 T	NNS	280 T	280 T	NNS	10 T	2.4 D	0.01 D	2.4 D	0.01 D
Methoxychlor	72-43-5	100	NNS	4670	4670	NNS	NNS	NNS	0.03	NNS	NNS
Methyl Bromide	74-83-9	47	1,500	1310	1310	NNS	NNS	5500	360	NNS	NNS
Methyl Chloride	74-87-3	NNS	NNS	NNS	NNS	NNS	NNS	270,000	15,000	NNS	NNS
Methyl Mercury	22967-92-6	NNS	0.3 mg/kg	NNS	NNS	NNS	NNS	1.4	0.77	NNS	NNS
Methylene Chloride	75-09-2	4.6	590	620	56,000	NNS	NNS	97,000	5500	NNS	NNS
Mirex	2385-85-5	NNS	NNS	NNS	NNS	NNS	NNS	NNS	0.001	NNS	NNS
Naphthalene	91-20-3	140	1520	18,670	18,670	NNS	NNS	3200	580	NNS	NNS
Nickel (as Ni)	7440-02-0	610 T	4600	18670 T	18670 T	NNS	NNS	Tbl A-4[f]	Tbl A-4[f]	Tbl A-4[f]	Tbl A-4[f]
Nitrate (as N)	14797-55-8	10,000	NNS	1,493,330	1,493,330	NNS	NNS	NNS	NNS	NNS	NNS
Nitrite (as N)	14797-65-0	1000	NNS	93,330	93,330	NNS	NNS	NNS	NNS	NNS	NNS
Nitrate/Nitrite (as Total N)		10,000	NNS	NNS	NNS	NNS	NNS	NNS	NNS	NNS	NNS
Nitrobenzene	98-95-3	17	690	470	470	NNS	NNS	1300	850	NNS	NNS
o-Nitrophenol	88-75-5	NNS	NNS	NNS	NNS	NNS	NNS	NNS	NNS	NNS	NNS
p-Nitrophenol	100-02-7	NNS	NNS	NNS	NNS	NNS	NNS	4100	3000	NNS	NNS
Nitrosamines		0.0008	1.24	NNS	NNS	NNS	NNS	NNS	NNS	NNS	NNS
N-nitrosodibutylamine	924-16-3	0.0063	0.22	NNS	NNS	NNS	NNS	NNS	NNS	NNS	NNS
N-nitrosodiethylamine	55-18-5	0.0008	1.24	NNS	NNS	NNS	NNS	NNS	NNS	NNS	NNS
N-nitrosodimethylamine	62-75-9	0.00069	3	0.1	NNS	NNS	NNS	NNS	NNS	NNS	NNS
N-nitrosodi-n-propylamine	621-64-7	0.005	0.51	1.0	88,670	NNS	NNS	NNS	NNS	NNS	NNS

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		DWS + FC, GWR, PCC	FC	FBC	PBC	AgI	AgL	$A\&W_w$		$A\&W_e$	
								Acute	Chronic	Acute	Chronic
N-nitrosodiphenylamine	86-30-6	3.3	6	950	NNS	NNS	NNS	2900	200	NNS	NNS
N-nitrosopyrrolidine	930-55-2	0.016	34	NNS	NNS	NNS	NNS	NNS	NNS	NNS	NNS
Nonylphenol	104-40-5	NNS	NNS	NNS	NNS	NNS	NNS	28	6.6	NNS	NNS
Oxamyl	23135-22-0	200	NNS	23,330	23,330	NNS	NNS	NNS	NNS	NNS	NNS
Parathion	56-38-2	NNS	NNS	NNS	NNS	NNS	NNS	0.065	0.013	NNS	NNS
Paraquat	1910-42-5	30	NNS	4200	4200	NNS	NNS	100	54	NNS	NNS
Pentacholorbenzene	608-93-5	1.4	1.5	NNS	NNS	NNS	NNS	NNS	NNS	NNS	NNS
Pentachlorophenol	87-86-5	0.27	3	40	28,000	NNS	NNS	19	15	NNS	NNS
Permethrin	52645-53-1	350	NNS	46,670	46,670	NNS	NNS	0.3	0.2	NNS	NNS
Phenanthrene	85-01-8	NNS	NNS	NNS	NNS	NNS	NNS	30	6.0	NNS	NNS
Phenol	108-95-2	21,000	1,700,000	280,000	280,000	NNS	NNS	7000	1000	180,000	26,000
Picloram	1918-02-1	500	NNS	NNS	NNS	NNS	NNS	NNS	NNS	NNS	NNS
Polychlorinated biphenyls (PCBs)	1336-36-3	0.000064	0.000064	2	19	0.001	0.001	2	0.014	11	2.5
Pyrene	129-00-0	830	4000	28,000	28,000	NNS	NNS	NNS	NNS	NNS	NNS
Selenium (as Se)	7782-49-2	170 T	4200 T	4670 T	4670 T	20 T	50 T	NNS	2.0 T	33 T	2.0 T
Silver (as Ag)	7440-22-4	35 T	8000 T	4670 T	4670 T	NNS	NNS	Tbl A-4 [f]	NNS	Tbl A-4 [f]	NNS
Simazine	112-34-9	4	NNS	4670	4670	NNS	NNS	NNS	NNS	NNS	NNS
Styrene	100-42-5	100	NNS	186,670	186,670	NNS	NNS	5600	370	NNS	NNS
``Sulfides		NNS	NNS	NNS	NNS	NNS	NNS	80	NNS	100	NNS
1,2,4,5-Tetrachlorobenzene	95-94-3	0.97	1.1	NNS	NNS	NNS	NNS	NNS	NNS	NNS	NNS

Note: All numeric standards not otherwise indicated are total recoverable values (for historic reasons some numeric standards are marked redundantly as total recoverable).

[a] Chemical Abstract System (CAS) number is a unique identification number given to each chemical.

[b] The numeric standards to protect these uses shall not be exceeded.

[c] The standard to protect this use is 0.003 µg/L aldrin/dieldrin

[d] Values for ammonia are contained in Table A-3

[e] The standard to protect this use is 7 million fibers (longer than 10 micrometers) per liter.

[f] Numeric criterion calculated as detailed in Table A-4.

[g] This criterion applies to DDT and its metabolites (i.e. the total concentration of DDT and its metabolites should not exceed this value)

µg/L =Micrograms per liter
NNS =No numeric standard
D =Dissolved
T =Total recoverable
TTHM =The chemical is a trihalomethane. See Trihalomethanes, Total for DWS standard.
Acute =Acute Toxicity
Chronic =Chronic Toxicity
$A\&W_e$ =Aquatic and Wildlife (Ephemeral)

DWS =Domestic Water Source
GWR =Groundwater Recharge
PCC =Primary Contact Ceremonial
FC =Fish Consumption
FBC =Full Body Contact
PBC =Partial Body Contact
AgI =Agricultural Irrigation
AgL =Agricultural Livestock Watering
$A\&W_w$ =Aquatic and Wildlife (Warm Water Habitat)

Table A-2. Numeric Criteria for Toxic Constituents

Parameter	CAS [a] Number	Numeric Standard [b] (µg/L unless otherwise noted)									
		DWS + FC, GWR, PCC	FC	FBC	PBC	AgI	AgL	$A\&W_w$		$A\&W_e$	
								Acute	Chronic	Acute	Chronic
2,3,7,8-Tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD)	1746-01-6	5 E-9	5.1 E-9	3 E-5	1 E-3	NNS	NNS	0.01	0.005	0.1	0.01
1,1,2,2-Tetrachloroethane	79-34-5	0.17	4	20	46,670	NNS	NNS	4700	3200	NNS	NNS
Tetrachloroethylene	127-18-4	0.69	3.3	9330	9330	NNS	NNS	6500	680	15,000	1600
Thallium (as Tl)	7440-28-0	0.24 T	0.47 T	75 T	75 T	NNS	NNS	700 D	150 D	NNS	NNS
Toluene	108-88-3	1300	15,000	74,670	74,670	NNS	NNS	8700	180	NNS	NNS
Toxaphene	8001-35-2	0.00028	0.00028	4.0	930	0.005	0.005	0.73	0.002	11	1.5
Tributyltin (TBT)	688-73-3	NNS	NNS	NNS	NNS	NNS	NNS	0.46	0.072	NNS	NNS
1,2,4-Trichlorobenzene	120-82-1	35	70	9330	9330	NNS	NNS	1700	300	NNS	NNS
1,1,1-Trichloroethane	71-55-6	200	NNS	NNS	NNS	1000	NNS	2600	1600	NNS	NNS
1,1,2-Trichloroethane	79-00-5	0.59	16	80	3730	NNS	NNS	18,000	12,000	NNS	NNS
Trichloroethylene	79-01-6	2.5	30	360	2800	NNS	NNS	20,000	1300	NNS	NNS
2,4,5-Trichlorophenol	95-95-4	1800	3600	NNS	NNS	NNS	NNS	NNS	NNS	NNS	NNS
2,4,6-Trichlorophenol	88-06-2	1.4	2.4	420	NNS	NNS	NNS	160	25	3000	460
Trihalomethanes, Total		80	NNS	NNS	NNS	NNS	NNS	NNS	NNS	NNS	NNS
Uranium (as Ur)	7440-61-1	30 D	NNS	2800	2800	NNS	NNS	NNS	NNS	NNS	NNS
Vanadium (V)	7440-62-62	NNS	NNS	NNS	NNS	100	100	NNS	NNS	NNS	NNS
Vinyl chloride	75-01-4	0.025	2.4	6.0	2800	NNS	NNS	NNS	NNS	NNS	NNS
Xylenes (Total)	1330-20-7	10,000	NNS	186,670	186,670	NNS	NNS	NNS	NNS	NNS	NNS
Zinc (as Zn)	7440-66-6	7400 T	26,000 T	280,000 T	280,000 T	10,000	25,000 T	Tbl A-4[f]	Tbl A-4[f]	Tbl A-4[f]	Tbl A-4[f]

Note: All numeric standards not otherwise indicated are total recoverable values (for historic reasons some numeric standards are marked redundantly as total recoverable).

[a] Chemical Abstract System (CAS) number is a unique identification number given to each chemical.

[b] The numeric standards to protect these uses shall not be exceeded.

[c] The standard to protect this use is 0.003 µg/L aldrin/dieldrin

[d] Values for ammonia are contained in Table A-3

[e] The standard to protect this use is 7 million fibers (longer than 10 micrometers) per liter.

[f] Numeric criterion calculated as detailed in Table A-4.

[g] This criterion applies to DDT and its metabolites (i.e. the total concentration of DDT and its metabolites should not exceed this value)

µg/L =Micrograms per liter
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Acute =Acute Toxicity
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DWS =Domestic Water Source
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PCC =Primary Contact Ceremonial
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AgI =Agricultural Irrigation
AgL =Agricultural Livestock Watering
$A\&W_w$ =Aquatic and Wildlife (Warm Water Habitat)

Table A-3. Numeric Water Quality Criteria for Ammonia

Table A-3a. Acute Criteria for Total Ammonia (in mg N/L)	
pH	Salmonids Absent
6.5	48.8
6.6	46.8
6.7	44.6
6.8	42.0
6.9	39.2
7.0	36.1
7.1	32.9
7.2	29.5
7.3	26.2
7.4	23.0
7.5	19.9
7.6	17.0
7.7	14.4
7.8	12.1
7.9	10.1
8.0	8.41
8.1	6.95
8.2	5.73
8.3	4.71
8.4	3.88
8.5	3.20
8.6	2.65
8.7	2.20
8.8	1.84
8.9	1.56
9.0	1.32

Table A-3b. Chronic Criteria for Total Ammonia (in mg/L), Early Life Stages Present										
	Temperature, °C									
pH	0	14	16	18	20	22	24	26	28	30
6.5	6.67	6.67	6.06	5.33	4.68	4.12	3.62	3.18	2.80	2.46
6.6	6.57	6.57	5.97	5.25	4.61	4.05	3.56	3.13	2.75	2.42
6.7	6.44	6.44	5.86	5.15	4.52	3.98	3.50	3.07	2.70	2.37
6.8	6.29	6.29	5.72	5.03	4.42	3.89	3.42	3.00	2.64	2.32
6.9	6.12	6.12	5.56	4.89	4.30	3.78	3.32	2.92	2.57	2.25
7.0	5.91	5.91	5.37	4.72	4.15	3.65	3.21	2.82	2.48	2.18
7.1	5.67	5.67	5.15	4.53	3.98	3.50	3.08	2.70	2.38	2.09
7.2	5.39	5.39	4.90	4.31	3.78	3.33	2.92	2.57	2.26	1.99
7.3	5.08	5.08	4.61	4.06	3.57	3.13	2.76	2.42	2.13	1.87
7.4	4.73	4.73	4.30	3.78	3.33	2.92	2.57	2.26	1.98	1.74
7.5	4.36	4.36	3.97	3.49	3.06	2.69	2.37	2.08	1.83	1.61
7.6	3.98	3.98	3.61	3.18	2.79	2.45	2.16	1.90	1.67	1.47
7.7	3.58	3.58	3.25	2.86	2.51	2.21	1.94	1.71	1.50	1.32
7.8	3.18	3.18	2.89	2.54	2.23	1.96	1.73	1.52	1.33	1.17
7.9	2.80	2.80	2.54	2.24	1.96	1.73	1.52	1.33	1.17	1.03
8.0	2.43	2.43	2.21	1.94	1.71	1.50	1.32	1.16	1.02	0.897
8.1	2.10	2.10	1.91	1.68	1.47	1.29	1.14	1.00	0.879	0.773
8.2	1.79	1.79	1.63	1.43	1.26	1.11	0.973	0.855	0.752	0.661
8.3	1.52	1.52	1.39	1.22	1.07	0.941	0.827	0.727	0.639	0.562
8.4	1.29	1.29	1.17	1.03	0.906	0.796	0.700	0.615	0.541	0.475
8.5	1.09	1.09	0.990	0.870	0.765	0.672	0.591	0.520	0.457	0.401
8.6	0.920	0.920	0.836	0.735	0.646	0.568	0.499	0.439	0.386	0.339
8.7	0.778	0.778	0.707	0.622	0.547	0.480	0.422	0.371	0.326	0.287
8.8	0.661	0.661	0.601	0.528	0.464	0.408	0.359	0.315	0.277	0.244
8.9	0.565	0.565	0.513	0.451	0.397	0.349	0.306	0.269	0.237	0.208
9.0	0.486	0.486	0.442	0.389	0.342	0.300	0.264	0.232	0.204	0.179

Notes:

1. pH and temperature are field measurements taken at the same time and location as the water samples destined for the laboratory analysis of ammonia.
2. If field measured pH and/or temperature values fall between the A & W_w acute total ammonia tabular values, round field-measured values according to standard scientific rounding procedures to nearest tabular value to determine the ammonia standard.

Table A-4. Equations for Calculating Freshwater Dissolved Metals Criteria as a Function of Total Hardness

Metal	$A\&W_w$				$A\&W_e$				Freshwater Conversion Factors (CF)	
	Acute		Chronic		Acute		Chronic			
	m_A	b_A	m_C	b_C	m_A	b_A	m_C	b_C	Acute	Chronic
Cadmium	1.0166	-3.924	0.7409	-4.719	1.0166	-1.497	0.7852	-3.49	1.136672-[(ln Hd)(0.041838)]	1.101672-[(ln Hd)(0.041838)]
Chromium (III)	0.8190	3.7256	0.8190	0.6848	0.8190	4.9361	0.819	1.561	0.316	0.860
Copper	0.9422	-1.700	0.8545	-1.702	0.9422	-1.1514	0.8545	-1.1448	0.960	0.960
Lead	1.273	-1.460	1.273	-4.705	1.273	-0.7131	1.273	-3.9518	1.46203-[(ln Hd)(0.145712)]	1.46203-[(ln Hd)(0.145712)]
Nickel	0.8460	2.255	0.8460	0.0584	0.8460	4.4389	0.846	2.2417	0.998	0.997
Silver	1.72	-6.59	----	---	1.72	-6.59	---	---	0.85	---
Zinc	0.8473	0.884	0.8473	0.884	0.8473	3.1342	0.8473	3.0484	0.978	0.986

Hardness-dependent metals' criteria may be calculated from the following:

$$\text{Acute(dissolved)} = \exp\{m_A [\ln (Hd)] + b_A\} (CF)$$

$$\text{Chronic(dissolved)} = \exp\{m_C [\ln (Hd)] + b_C\} (CF)$$

Notes:

1. Hardness, expressed as mg/L $CaCO_3$, is inserted into the equation where it says "Hd". Hardness is determined according to the following criteria:
   a. If the receiving water body has an $A\&W_w$ designated use the hardness value used is the hardness exceeded 85% of the time in the receiving water body, except that the hardness may not exceed 400 mg/L $CaCO_3$.
   b. If the receiving water body has an $A\&W_e$ designated use the hardness value used is the hardness of the effluent exceeded 85% of the time in the receiving water body, except that the hardness may not exceed 400 mg/L $CaCO_3$.

e = Base exponential function.

ln Hd = The natural log value of the hardness expressed as mg/L as calcium carbonate. For waters with a hardness of 400 mg/L or less as calcium carbonate, the hardness from footnote 1 shall be used. For waters with a hardness over 400 mg/L as calcium carbonate, a hardness of 400 mg/L shall be used (footnote 1).

$A\&W_w$ = Aquatic and Wildlife (Warm Water Habitat)

$A\&W_e$ = Aquatic and Wildlife (Ephemeral)

Acute = Acute Toxicity

Chronic = Chronic Toxicity