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.
NOTICE OF FINAL RULEMAKING

TITLE 18. ENVIRONMENTAL QUALITY
CHAPTER 11. DEPARTMENT OF ENVIRONMENTAL QUALITY
WATER QUALITY STANDARDS

PREAMBLE

1. Sections Affected
   Rulemaking Action
   R18-11-101               Amend
   Appendix A               Amend

2. The statutory authority for the rulemaking, including both the authorizing statute (general) and the statutes the
   rules are implementing (specific):
   Authorizing statutes: A.R.S. §§ 49-202(A), 49-203(A)(1), and 49-221
   Implementing statute: A.R.S. § 49-222

3. The effective date of the rules:
   April 8, 2003

4. A list of all previous notices appearing in the Register addressing the final rules:
   Notice of Rulemaking Docket Opening: 8 A.A.R. 4696, November 8, 2002
   Notice of Proposed Rulemaking: 8 A.A.R. 4676, November 8, 2002

5. The name and address of agency personnel with whom persons may communicate regarding the rulemaking:
   Name: Shirley J. Conard
   Address: 1110 W. Washington, 5415B-3
            Phoenix, AZ 85007
   Telephone: (602) 771-4632
   Fax: (602) 771-4674

6. An explanation of the rules, including the agency’s reasons for initiating the rules:
   This rulemaking makes technical corrections required by the U.S. Environmental Protection Agency (EPA), and other
   minor technical and clerical corrections, to rules for Water Quality Standards for Surface Waters. The corrections are
   required by EPA before EPA will complete its review and approval of the Water Quality Standards for Surface Waters
   (which were approved at the February 7, 2002 meeting of the Governor’s Regulatory Review Council).

R18-11-101. Definitions

EPA believes that the current definition for “existing use” is inconsistent with the federal definition at 40 CFR
131.3(e).

The Department revised the definition using the language in 40 CFR 131.3(e).

EPA expressed concern over the definitions for “ephemeral water” and “intermittent surface water.” EPA indicated
that the definition of “intermittent surface water” implies that a surface water may flow for up to 30 days and still be
considered an ephemeral water. This raised a concern as to how this bright line definition would affect the Depart-
ment’s proposed repeal of chronic aquatic life criteria for ephemeral waters. EPA is concerned that some surface
waters that flow for periods of up to 30 days should be protected by both acute and chronic aquatic life standards.

The Department agrees that this is an arbitrary restriction and removed the 30-day time period from the definition and
amended the term for clarity. The Department will retain the current definition of “ephemeral water,” which is a surface
water that 1) has a channel that is at all times above the water table, and 2) flows only in direct response to precipitation.

The Department believes that these two definitions, as amended, are complementary. An ephemeral water is a nor-
mally dry watercourse that flows only in direct response to precipitation. An intermittent stream flow is a stream that
flows seasonally.

Appendix A. Numeric Water Quality Criteria

Table 1. Human Health and Agricultural Designated Uses

Dioxin

The Department revised the human health criteria for 2,3,7,8-tetrachlorodibenzo-p-dioxin in the February 2002
(effective March 8, 2002) rulemaking. Because oral cancer potency slopes (ql*) for dioxin were not available in the
Integrated Risk Information System (IRIS) database at the time the Department proposed criteria for dioxin, the
Department derived criteria for dioxin using a minimum risk level (MRL) developed by the Agency for Toxic Substances and Disease Registry. However, EPA has pointed out in their review that the resulting criteria for dioxin are significantly less than the dioxin criteria adopted in 1996:

<table>
<thead>
<tr>
<th></th>
<th>1996</th>
<th>2002</th>
</tr>
</thead>
<tbody>
<tr>
<td>DWS:</td>
<td>0.0000003 µg/L</td>
<td>0.00003 µg/L</td>
</tr>
<tr>
<td>FC:</td>
<td>0.000000004 µg/L</td>
<td>0.002 µg/L</td>
</tr>
<tr>
<td>FBC:</td>
<td>0.00009 µg/L</td>
<td>FBC: 1.4 µg/L</td>
</tr>
<tr>
<td>PBC:</td>
<td>NNS</td>
<td>PBC: 1.4 µg/L</td>
</tr>
</tbody>
</table>

After discussion with EPA the Department agreed that due to the ongoing reassessment of human health risks from exposure to dioxin, it is appropriate to retain the 1996 criteria for dioxin for domestic water source (DWS), fish consumption (FC), and the full body contact (FBC) designated uses that were based on a previously available q 1 *.

While the Department believes that it is proper to use minimum risk levels to derive human health criteria for pollutants when data is not available in IRIS, the Department also recognizes that dioxin is a special case because of the national dialogue and ongoing reassessment. For this reason, the Department is re-adopting the 1996 criteria for DWS, FC, and FBC designated uses.

The Department did not use the carcinogen procedure to derive human health criteria for the partial body contact (PBC) designated use for any priority pollutant. The Department believes it is appropriate to use minimum risk levels to derive a criterion for dioxin for the PBC designated use. As EPA is aware, the Department did not have a numeric criterion for dioxin for PBC designated use in 1996. Thus, the Department will retain the criterion of 1.4 µg/L for dioxin for the PBC designated use.

**Polycyclic Aromatic Hydrocarbons**

In the February 2002 rulemaking, the Department revised the numeric criteria for a number of parameters belonging to the family of pollutants called polycyclic aromatic hydrocarbons (PAHs) including benz(a)anthracene, 3-4 benzfluoranthene, benzo(k)fluoranthene, chrysene, dibenz(ah)anthracene, and indeno (1,2,3-cd) pyrene. For each of these pollutants, the Department repealed the previously adopted human health criteria and replaced the numeric criteria with “NNS” (meaning “No Numeric Standard”) because of the unavailability of oral slope factors (q 1 *) in IRIS to derive new criteria. Each of the listed PAHs is considered a “probable” human carcinogen based on sufficient evidence of carcinogenicity in animals and inadequate or no evidence of carcinogenicity in humans (i.e., a Class B2 carcinogen). EPA objected to the repeal of numeric criteria for PAHs and asked the Department to adopt the criteria that had been in rule before the 2002 amendment.

The Department agreed to revised the criteria for the PAHs listed in Appendix A, Table 1. To address the problem of absent oral slope factors for the listed pollutants, the Department derived human health criteria based on the oral slope factor for benzo(a)pyrene. The Department used this approach to derive both the 1992 and 1996 criteria for the listed PAHs. However, the criteria was adjusted for the listed PAHs using a “potency equivalency factor.” This approach uses different factors to extrapolate the relative potency of one chemical from the data of a “chemical relative” and is an accepted standard/criteria derivation method in the absence of specific data. EPA proposed such an approach as a provisional guide in 1993, but never finalized the document.

The use of potency equivalency factors to adjust criteria for PAHs has already been accepted by EPA for the California Water Resources Board in deriving criteria.

**Table 2. Aquatic & Wildlife Designated Uses**

No changes have been made to the Table. The footnote section, however, has been amended to include the (p) footnote, which was inadvertently left out of the previous rulemaking, and additional parentheses, which were left out of the equations.

**Table 20. Chronic and Acute Water Quality Standards for dissolved Zinc**

The equations used by EPA to derive the zinc acute and chronic criteria resulted in acute standards that were more stringent than chronic standards. Given that the chronic averaging period is longer than the acute averaging period and should result in more stringent standards, this rulemaking corrects this deficiency by defaulting to the more stringent standards to protect the chronic aquatic and wildlife life use.

The Table for Chronic Water Quality Standards for dissolved Zinc, “Aquatic and Wildlife coldwater, warmwater and edw” has been deleted and the term “chronic” has been added to the Table for Acute Water Quality Standards for dissolved Zinc, “Aquatic and Wildlife coldwater, warmwater and edw.”

Other than Tables 1 and 2, the subsequent Tables within Appendix A were not labeled. These subsequent tables have been labeled in this rulemaking to provide stakeholders with easy access to specific information on numeric water quality.
Arizona Administrative Register
Notices of Final Rulemaking

7. A reference to any study relevant to the rules that the agency reviewed and either relied on or did not rely on in its evaluation of or justification for the rules, where the public may obtain or review each study, all data underlying each study, and any analysis of each study and other supporting material:

None

8. A showing of good cause why the rules are necessary to promote a statewide interest if the rules will diminish a previous grant of authority of a political subdivision of this state:

Not applicable

9. The summary of the economic, small business, and consumer impact:

This rulemaking makes changes requested by EPA and other minor technical and clerical corrections.

The revision of “existing use” is consistent with federal water quality standards regulations and the change to “intermittent water” further clarifies the meaning of the term and clearly distinguishes intermittent waters from ephemeral waters.

Appendix A, Table 1.
Numeric Criteria for Polycyclic Aromatic Hydrocarbons.
The numeric water quality criteria to protect human health for six pollutants belonging to a family of pollutants called polycyclic aromatic hydrocarbons (PAHs), have been revised. PAHs are described as volatile coal tar products and they are more typically found in air emissions as unwanted by-products of combustion.

In the last triennial review of Surface Water Quality Standards (effective March 8, 2002), the Department repealed the numeric water quality criteria for benz(a)anthracene, benzo(k)fluoranthene, 3,4-benzo(ghi)fluoranthene, chrysene, dibenz(ah)anthracene, and indeno(1,2,3-cd)pyrene because of the lack of human health effects data for those pollutants to derive criteria. EPA objected to the repeal of the numeric criteria for the six PAHs and urged that the Department adopt the numeric criteria for the PAHs that had been previously adopted in rules that were effective April 24, 1996. To avoid federal promulgation of numeric criteria for the six PAHs, the Department agreed to adopt the 1996 criteria and adjusted those criteria using an updated criteria derivation methodology. The use of the updated methodology results in minor changes to the numeric criteria that existed before the March 2002 revision of the Surface Water Quality Standards rules.

Since PAHs are only slightly soluble in water, they are not expected to be found in surface waters. The re-adoption of the numeric criteria will have little or no real world or practical effect. While state law requires the Department to adopt standards for PAHs, the Department does not routinely monitor surface waters for the presence of PAHs. Also, point source dischargers are not required to monitor for the presence of PAHs in discharges because there is little or no reasonable potential that the pollutants are present.

Numeric criteria for dioxin.
The Department is adopting numeric criteria for dioxin. In the last triennial review of Surface Water Quality Standards (effective March 8, 2002), the Department repealed numeric water quality criteria to protect human health for dioxin because of a lack of human health effects data to derive the criteria. As with the PAHs, EPA objected to the repeal of the previously-adopted numeric criteria for dioxin and urged the state to maintain the numeric criteria for dioxin that had been in place since 1996. To avoid a federal promulgation of human health criteria for dioxin by EPA, the Department agreed to re-propose the 1996 criteria for dioxin in this rulemaking.

Dioxin is a by-product in the manufacture of certain herbicides. Currently, all herbicidal products containing dioxin are banned by the federal government for most uses. To the Department’s knowledge, there are no herbicide manufacturing facilities in Arizona that may produce dioxin in a discharge that could find its way to a surface water to which the re-adopted standard applies. Dioxin also is formed in industrial processes involving the use of chlorine. One important example of an industrial process that produces dioxin is bleaching at paper pulp mills. The Department is aware of one facility in Arizona, Stone Container near Snowflake, Arizona, that is involved with paper bleaching and could possibly be affected by re-adoption of a numeric dioxin standard. However, the Stone Container facility does not discharge to a surface water to which surface water quality standards apply.

Renumbering and Consolidation of Tables.
The Department numbered the remaining tables under Appendix A and consolidated the acute and chronic toxicity tables for zinc in Appendix B.

Estimated Costs and Benefits to the Arizona Department of Environmental Quality.
The Department will benefit from the proposed rulemaking by eliminating all obstacles standing in the way of final EPA approval of (previously adopted) Surface Water Quality Standards. If this rulemaking is not approved, EPA Region IX will disapprove portions of the Surface Water Quality Standards and federally promulgate Surface Water Standards.
Quality Standards for Arizona. This would create confusion and regulatory uncertainty for the agency and the regulated community.

**Estimated Costs and Benefits to Political Subdivisions, Consumers, Small Businesses, Private or Public Employment, or State Revenue.**

This rulemaking does not impose administrative or other compliance costs on small businesses. The rules will have no economic, small business, or consumer impact on the Department, political subdivisions, consumers, small businesses, private or public employment, or state revenues.

10. **A description of the changes between the proposed rules, including supplemental notices, and final rules (if applicable):**

Only technical and grammatical changes were made between the proposed and final rules.

11. **A summary of the comments made regarding the rule and the agency response to them:**

None

12. **Any other matters prescribed by statute that are applicable to the specific agency or to any specific rule or class of rules:**

None

13. **Incorporations by reference and their location in the rules:**

None

14. **Were these rules previously adopted as emergency rules?**

No

15. **The full text of the rules follows:**

**TITLE 18. ENVIRONMENTAL QUALITY**

**CHAPTER 11. DEPARTMENT OF ENVIRONMENTAL QUALITY**

**WATER QUALITY STANDARDS**

**ARTICLE 1. WATER QUALITY STANDARDS FOR SURFACE WATERS**

Section

R18-11-101. Definitions

Appendix A. Numeric Water Quality Criteria

**ARTICLE 1. WATER QUALITY STANDARDS FOR SURFACE WATERS**

**R18-11-101. Definitions**

The terms of this Article have the following meanings:

1. “Acute toxicity” means toxicity involving a stimulus severe enough to induce a response rapidly. In aquatic toxicity tests, an effect observed in 96 hours or less is considered acute.
2. “AgI” means agricultural irrigation.
3. “AgL” means agricultural livestock watering.
4. “Agricultural irrigation” means the use of a surface water for the irrigation of crops.
5. “Agricultural livestock watering” means the use of a surface water as a supply of water for consumption by livestock.
6. “Annual mean” means the arithmetic mean of monthly values determined over a consecutive 12-month period, provided that monthly values are determined for at least three months. The monthly value is the arithmetic mean of all values determined in a calendar month.
7. “Aquatic and wildlife (cold water)” means the use of a surface water by animals, plants, or other cold-water organisms, generally occurring at elevations greater than 5000 feet, for habitation, growth, or propagation.
8. “Aquatic and wildlife (effluent-dependent water)” means the use of an effluent-dependent water by animals, plants, or other organisms for habitation, growth, or propagation.
9. “Aquatic and wildlife (ephemeral)” means the use of an ephemeral water by animals, plants, or other organisms, excluding fish, for habitation, growth, or propagation.
10. “Aquatic and wildlife (warm water)” means the use of a surface water by animals, plants, or other warm-water organisms, generally occurring at elevations less than 5000 feet, for habitation, growth, or propagation.
16. “Criteria” means elements of water quality standards that are expressed as pollutant concentrations, levels, or narrative statements representing a water quality that supports a designated use.
17. “Designated use” means a use specified in Appendix B of this Article for a surface water.
18. “Domestic water source” means the use of a surface 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.
20. “EDW” means effluent-dependent water.
21. “Effluent-dependent water” means a surface water that consists of discharges of treated wastewater that is classified as an effluent-dependent water by the Director under R18-11-113. An effluent-dependent water is a surface water that, without the discharge of treated wastewater, would be an ephemeral water.
22. “Ephemeral water” means a surface water that has a channel that is at all times above the water table, and that flows only in direct response to precipitation.
23. “Existing use” means a use of a surface water that occurs in a surface water or a use that the existing water quality of a surface water will allow. “Existing use” means those uses actually attained in the waterbody on or after November 28, 1975, whether or not they are included in the water quality standards.
24. “FBC” means full-body contact.
25. “FC” means fish consumption.
26. “Fish consumption” means the use of a surface water by humans for harvesting aquatic organisms for consumption. Harvestable aquatic organisms include, but are not limited to, fish, clams, turtles, crayfish, and frogs.
27. “Full-body contact” means the use of a surface water for swimming or other recreational activity that causes the human body to come into direct contact with the water to the point of complete submergence. The use is such that ingestion of the water is likely and sensitive body organs, such as the eyes, ears, or nose, may be exposed to direct contact with the water.
28. “Geometric mean” means the nth root of the product of n items or values. The geometric mean is calculated using the following formula:

\[ G.M. = \sqrt[n]{(Y_1)(Y_2)(Y_3)\ldots(Y_n)} \]

29. “Hardness” means the sum of the calcium and magnesium concentrations, expressed as calcium carbonate (CaCO₃) in milligrams per liter.
30. “Intermittent surface water” means a surface water stream or reach of a stream that flows continuously for 30 days or more only at certain times of the year, as when the surface water receives water from a spring or from another surface source, such as melting snow.
31. “Mixing zone” means a prescribed area or volume of a surface water that is contiguous to a point source discharge where initial dilution of the discharge takes place.
32. “National Pollutant Discharge Elimination System” means the point source discharge permit program established by § 402 of the Clean Water Act [33 U.S.C. §§ 1342].
33. “Ninetieth percentile” means the value that may not be exceeded by more than 10% of the observations in a consecutive 12 month period. A minimum of 10 samples, each taken at least 10 days apart, are required to determine a ninetieth percentile.
34. “NNS” means no numeric standard.
35. “Oil” means petroleum in any form, including but not limited to crude oil, gasoline, fuel oil, diesel oil, lubricating oil, or sludge.
36. “Partial-body contact” means the recreational 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 (for example, wading or boating). The use is such that ingestion of the water is not likely and sensitive body organs, such as the eyes, ears, or nose, will not normally be exposed to direct contact with the water.
37. “PBC” means partial-body contact.
38. “Perennial surface water” means a surface water that flows continuously throughout the year.
39. “Pollutant” means fluids, contaminants, toxic wastes, toxic pollutants, dredged spoil, solid waste, substances and chemicals, pesticides, herbicides, fertilizers and other agricultural chemicals, incinerator residue, sewage, garbage, sewage sludge, munitions, petroleum products, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt, and mining, industrial, municipal, and agricultural wastes or any other liquid, solid, gaseous, or hazardous substance.
40. “Practical quantitation limit” means the lowest level of quantitative measurement that can be reliably achieved during routine laboratory operations.
41. “Recreational uses” means the full-body contact and partial-body contact designated uses.
42. “Regional Administrator” means the Regional Administrator of Region IX of the U.S. Environmental Protection Agency.
43. “Surface water” means a water of the United States and includes the following:
   a. A water that is currently used, was used in the past, or may be susceptible to use in interstate or foreign commerce;
   b. An interstate water, including an interstate wetland;
   c. All other waters, such as an intrastate lake, reservoir, natural pond, river, stream (including an intermittent or ephemeral stream), creek, wash, draw, mudflat, sandflat, wetland, slough, backwater, prairie pothole, wet meadow, or playa lake, the use, degradation, or destruction of which would affect or could affect interstate or foreign commerce, including any such water:
      i. That is or could be used by interstate or foreign travelers for recreational or other purposes;
      ii. From which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or
      iii. That is used or could be used for industrial purposes by industries in interstate or foreign commerce;
   d. An impoundment of a surface water as defined by this definition;
   e. A tributary of a surface water identified in subsections (a) through (d) of this definition; and
   f. A wetland adjacent to a surface water identified in subsections (a) through (e) of this definition.
44. “Total nitrogen” means the sum of the concentrations of ammonia (NH₃), ammonium ion (NH₄⁺), nitrite (NO₂⁻), and nitrate (NO₃⁻), and dissolved and particulate organic nitrogen expressed as elemental nitrogen.
45. “Total phosphorus” means all of the phosphorus present in a sample, regardless of form, as measured by a persulfate digestion procedure.
46. “Toxic” means a pollutant, or combination of pollutants, which after discharge and upon exposure, ingestion, inhalation, or assimilation into an 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 the organism or its offspring.
47. “Unique water” means a surface water that is classified as an outstanding state resource water by the Director under R18-11-112.
48. “Use attainability analysis” means a structured scientific assessment of the factors affecting the attainment of a designated use including physical, chemical, biological, and economic factors.
49. “Wetland” means an area that is inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances does support, a prevalence of vegetation typically adapted for life in saturated soil conditions. A wetland includes a swamp, marsh, bog, cienega, tinaja, and similar areas.
50. “Zone of passage” means a continuous water route of volume, cross-sectional area, and quality necessary to allow passage of free-swimming or drifting organisms with no acutely toxic effect produced on the organisms.
Appendix A: Numeric Water Quality Criteria

### Table 1. Human Health and Agricultural Designated Uses

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>CAS NUMBER</th>
<th>DWS (µg/L)</th>
<th>FC (µg/L)</th>
<th>FBC (µg/L)</th>
<th>PBC (µg/L)</th>
<th>AgI (µg/L)</th>
<th>AgL (µg/L)</th>
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</thead>
<tbody>
<tr>
<td>Acenaphthene</td>
<td>83-32-9</td>
<td>420</td>
<td>2670</td>
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<td>84,000</td>
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<td>2,800 T</td>
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</tr>
<tr>
<td>Bis (2-chloroethoxy)</td>
<td>111-91-1</td>
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<td>NNS</td>
<td>NNS</td>
<td>NNS</td>
<td>NNS</td>
<td>NNS</td>
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### Arizona Administrative Register

**Notices of Final Rulemaking**

February 28, 2003 Page 723 Volume 9, Issue 9

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### Appendix A: Numeric Water Quality Criteria

#### Table 1. Human Health and Agricultural Designated Uses

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>CAS NUMBER</th>
<th>DWS (µg/L)</th>
<th>FC (µg/L)</th>
<th>FBC (µg/L)</th>
<th>PBC (µg/L)</th>
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## Appendix A: Numeric Water Quality Criteria

### Table 1. Human Health and Agricultural Designated Uses

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<th>PARAMETER</th>
<th>CAS NUMBER</th>
<th>DWS (µg/L)</th>
<th>FC (µg/L)</th>
<th>FBC (µg/L)</th>
<th>PBC (µg/L)</th>
<th>AgI (µg/L)</th>
<th>AgL (µg/L)</th>
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<td>Hexachlorobutadiene</td>
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<td>0.006</td>
<td>0.01</td>
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<td>Hexachlorocyclohexane beta</td>
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<td>0.78</td>
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<td>Hexachlorocyclohexane delta</td>
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<td>NNS</td>
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<td>Hexachlorocyclohexane gamma (lindane)</td>
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<td>Hexachlorocyclopentadiene</td>
<td>77-47-4</td>
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<td>Hexachloroethane</td>
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<td>9</td>
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<td>Indeno (1,2,3-cd) pyrene</td>
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<td>NNS</td>
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<td>NNS</td>
<td>NNS</td>
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<td>Isophorone</td>
<td>78-59-1</td>
<td>37</td>
<td>2,600</td>
<td>1,500</td>
<td>280,000</td>
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<td>NNS</td>
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<td>Lead (as Pb)</td>
<td>7439-97-1</td>
<td>15 T</td>
<td>NNS</td>
<td>15 T</td>
<td>15 T</td>
<td>10000 T</td>
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<tr>
<td>Manganese (as Mn)</td>
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<td>980 T</td>
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<td>196,000 T</td>
<td>196,000 T</td>
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<td>Mercury (as Hg)</td>
<td>7439-97-6</td>
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<td>0.6 T</td>
<td>420 T</td>
<td>420 T</td>
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<td>Methoxychlor</td>
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<td>Naphthalene</td>
<td>91-20-3</td>
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<td>NNS</td>
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<td>Nickel (as Ni)</td>
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<td>NNS</td>
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<tr>
<td>Nitrate (as N)</td>
<td>14797-55-8</td>
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<td>2,240,000</td>
<td>2,240,000</td>
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<td>NNS</td>
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<tr>
<td>Nitrite (as N)</td>
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<td>10000</td>
<td>NNS</td>
<td>140,000</td>
<td>140,000</td>
<td>NNS</td>
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</table>
### Appendix A: Numeric Water Quality Criteria

#### Table 1. Human Health and Agricultural Designated Uses

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>CAS NUMBER</th>
<th>DWS (µg/L)</th>
<th>FC (µg/L)</th>
<th>FBC (µg/L)</th>
<th>PBC (µg/L)</th>
<th>AgI (µg/L)</th>
<th>AgL (µg/L)</th>
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<tr>
<td>Nitrate/Nitrite (as Total N)</td>
<td>10000</td>
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<td>NNS</td>
<td>NNS</td>
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<td>Nitrobenzene</td>
<td>98-95-3</td>
<td>3.5</td>
<td>1,900</td>
<td>700</td>
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<tr>
<td>o-Nitrophenol</td>
<td>88-75-5</td>
<td>NNS</td>
<td>NNS</td>
<td>NNS</td>
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<td>p-Nitrophenol</td>
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<td>N-nitrosodimethylaniline</td>
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<td>N-nitrosodiphenylamine</td>
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<td>N-nitrosodi-n-propylamine</td>
<td>621-64-7</td>
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<td>Picloram</td>
<td>1918-02-1</td>
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<td>24,300</td>
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<td>Polychlorinated dibenzo- (PCBs)</td>
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<td>28</td>
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<td>Pyrene</td>
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<td>210</td>
<td>10,800</td>
<td>42,000</td>
<td>42,000</td>
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<td>NNS</td>
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<td>Selenium (as Se)</td>
<td>7782-49-2</td>
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<td>9000 T</td>
<td>7,000 T</td>
<td>7,000 T</td>
<td>20 T</td>
<td>50 T</td>
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<tr>
<td>Silver (as Ag)</td>
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<td>107,700 T</td>
<td>7,000 T</td>
<td>7,000 T</td>
<td>NNS</td>
<td>NNS</td>
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<td>Simazine</td>
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<td>NNS</td>
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<td>7,000</td>
<td>NNS</td>
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<td>Styrene</td>
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<td>NNS</td>
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<td>Sulfides</td>
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<td>7</td>
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<td>3,500</td>
<td>14,000</td>
<td>14,000</td>
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<td>NNS</td>
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<td>Thallium (as Tl)</td>
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<td>112 T</td>
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<td>Toluene</td>
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<td>280,000</td>
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<td>Toxaphene</td>
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<td>1,2,4-Trichlorobenzene</td>
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<td>950</td>
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<td>200</td>
<td>200</td>
<td>1000</td>
<td>NNS</td>
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<tr>
<td>1,1,2-Trichloroethane</td>
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<td>5</td>
<td>42</td>
<td>25</td>
<td>5,600</td>
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<td>203,200</td>
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<td>6.5</td>
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<td>2-(2,4,5-Trichlorophenoxy) propionic acid (2,4,5-TP)</td>
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<td>11,200</td>
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<td>NNS</td>
<td>NNS</td>
<td>NNS</td>
<td>NNS</td>
<td>NNS</td>
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<tr>
<td>Uranium (as Ur)</td>
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<td>NNS</td>
<td>NNS</td>
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<td>Vinyl chloride</td>
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<td>13</td>
<td>2</td>
<td>4,200</td>
<td>NNS</td>
<td>NNS</td>
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<tr>
<td>Xylenes (Total)</td>
<td>1330-20-7</td>
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<td>NNS</td>
<td>2,800,000</td>
<td>2,800,000</td>
<td>NNS</td>
<td>NNS</td>
</tr>
<tr>
<td>Zinc (as Zn)</td>
<td>7440-66-6</td>
<td>2100 T</td>
<td>69,000 T</td>
<td>420,000 T</td>
<td>420,000 T</td>
<td>10000 T</td>
<td>25000 T</td>
</tr>
</tbody>
</table>

*Chemical Abstract System (CAS) number is a unique identification number given to each chemical.*
## Appendix A: Numeric Water Quality Criteria

### Table 2. Aquatic & Wildlife Designated Uses

No change to Table

**Footnotes**

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

b. Values for ammonia are contained in separate tables located at the end of Appendix A.

c. Cadmium

A&Wc acute standard: \( e^{(1.128 \ln(\text{Hardness}) - 3.6867)} \times (1.136672 - \ln(\text{hardness}) \times 0.041838) \)

A&Wc chronic standard: \( e^{(0.7852 \ln(\text{Hardness}) - 2.7755)} \times (1.101672 - \ln(\text{hardness}) \times 0.041838) \)

A&Ww acute standard: \( e^{(1.128 \ln(\text{Hardness}) - 3.6867)} \times (1.136672 - \ln(\text{hardness}) \times 0.041838) \)

A&Ww chronic standard: \( e^{(0.7852 \ln(\text{Hardness}) - 2.7755)} \times (1.101672 - \ln(\text{hardness}) \times 0.041838) \)

A&Wedw acute standard: \( e^{(1.128 \ln(\text{Hardness}) - 3.6867)} \times (1.136672 - \ln(\text{hardness}) \times 0.041838) \)

A&Wedw chronic standard: \( e^{(0.7852 \ln(\text{Hardness}) - 2.7755)} \times (1.101672 - \ln(\text{hardness}) \times 0.041838) \)

A&We acute standard: \( e^{(1.128 \ln(\text{Hardness}) - 0.9691)} \times (1.136672 - \ln(\text{hardness}) \times 0.041838) \)

(See Footnote k)

d. Chromium III

A&Wc acute standard: \( e^{(0.8190 \ln(\text{Hardness}) + 3.7256)} \times 0.316 \)

A&Wc chronic standard: \( e^{(0.8190 \ln(\text{Hardness}) + 0.6848)} \times 0.86 \)

A&Ww acute standard: \( e^{(0.8190 \ln(\text{Hardness}) + 3.7256)} \times 0.316 \)

A&Ww chronic standard: \( e^{(0.8190 \ln(\text{Hardness}) + 0.6848)} \times 0.86 \)

A&Wedw acute standard: \( e^{(0.8190 \ln(\text{Hardness}) + 3.7256)} \times 0.316 \)

A&Wedw chronic standard: \( e^{(0.8190 \ln(\text{Hardness}) + 0.6848)} \times 0.86 \)

A&We acute standard: \( e^{(0.8190 \ln(\text{Hardness}) + 4.9361)} \times 0.316 \)

(See Footnote k)

e. Copper

A&Wc acute standard: \( e^{(0.9422 \ln(\text{Hardness}) - 1.7)} \times 0.96 \)

A&Wc chronic standard: \( e^{(0.8545 \ln(\text{Hardness}) - 1.702)} \times 0.96 \)

A&Ww acute standard: \( e^{(0.9422 \ln(\text{Hardness}) - 1.7)} \times 0.96 \)

A&Ww chronic standard: \( e^{(0.8545 \ln(\text{Hardness}) - 1.702)} \times 0.96 \)

A&Wedw acute standard: \( e^{(0.9422 \ln(\text{Hardness}) - 1.7)} \times 0.96 \)

A&Wedw chronic standard: \( e^{(0.8545 \ln(\text{Hardness}) - 1.702)} \times 0.96 \)

A&We acute standard: \( e^{(0.9422 \ln(\text{Hardness}) - 1.1514)} \times 0.96 \)

(See Footnote k)

f. Lead

A&Wc acute standard: \( e^{(1.2730 \ln(\text{Hardness}) - 1.460)} \times (1.46203 - \ln(\text{hardness}) \times 0.145712) \)

A&Wc chronic standard: \( e^{(1.2730 \ln(\text{Hardness}) - 4.705)} \times (1.46203 - \ln(\text{hardness}) \times 0.145712) \)

A&Ww acute standard: \( e^{(1.2730 \ln(\text{Hardness}) - 1.460)} \times (1.46203 - \ln(\text{hardness}) \times 0.145712) \)

A&Ww chronic standard: \( e^{(1.2730 \ln(\text{Hardness}) - 4.705)} \times (1.46203 - \ln(\text{hardness}) \times 0.145712) \)

A&Wedw acute standard: \( e^{(1.2730 \ln(\text{Hardness}) - 1.460)} \times (1.46203 - \ln(\text{hardness}) \times 0.145712) \)

A&Wedw chronic standard: \( e^{(1.2730 \ln(\text{Hardness}) - 4.705)} \times (1.46203 - \ln(\text{hardness}) \times 0.145712) \)

(See Footnote k)

g. Nickel

A&Wc acute standard: \( e^{(0.8460 \ln(\text{Hardness}) + 2.255)} \times 0.998 \)

A&Wc chronic standard: \( e^{(0.8460 \ln(\text{Hardness}) + 0.0584)} \times 0.997 \)

A&Ww acute standard: \( e^{(0.8460 \ln(\text{Hardness}) + 2.255)} \times 0.998 \)

A&Ww chronic standard: \( e^{(0.8460 \ln(\text{Hardness}) + 0.0584)} \times 0.997 \)

A&Wedw acute standard: \( e^{(0.8460 \ln(\text{Hardness}) + 2.255)} \times 0.998 \)

A&Wedw chronic standard: \( e^{(0.8460 \ln(\text{Hardness}) + 0.0584)} \times 0.997 \)

A&We acute standard: \( e^{(0.8460 \ln(\text{Hardness}) + 4.4389)} \times 0.998 \)

(See Footnote k)

h. Pentachlorophenol

No change

i. Silver

A&Wc acute standard: \( e^{(1.72 \ln(\text{Hardness}) - 6.52)} \times 0.85 \)

A&Wc chronic standard: \( e^{(1.72 \ln(\text{Hardness}) - 6.52)} \times 0.85 \)

A&Ww acute standard: \( e^{(1.72 \ln(\text{Hardness}) - 6.52)} \times 0.85 \)

A&Ww chronic standard: \( e^{(1.72 \ln(\text{Hardness}) - 6.52)} \times 0.85 \)

A&Wedw acute standard: \( e^{(1.72 \ln(\text{Hardness}) - 6.52)} \times 0.85 \)

A&Wedw chronic standard: \( e^{(1.72 \ln(\text{Hardness}) - 6.52)} \times 0.85 \)
(See Footnote k)

j. Zinc
A&Wc acute standard: \( e^{(0.8473 \cdot \ln(\text{Hardness}) + 0.884)} \times 0.978 \)
A&Wc chronic standard: \( e^{(0.8473 \cdot \ln(\text{Hardness}) + 0.884)} \times 0.978 \)
A&Ww acute standard: \( e^{(0.8473 \cdot \ln(\text{Hardness}) + 0.532 - 0.884)} \times 0.978 \)
A&Ww chronic standard: \( e^{(0.8473 \cdot \ln(\text{Hardness}) + 0.532 - 0.884)} \times 0.978 \)
A&Wedw acute standard: \( e^{(0.8473 \cdot \ln(\text{Hardness}) + 0.532 - 0.884)} \times 0.978 \)
A&We acute standard: \( e^{(0.8473 \cdot \ln(\text{Hardness}) + 3.1342)} \times 0.978 \)

(See Footnote k)

k. No change
l. No change
m. No change
n. No change
o. No change
p. The standard to protect this use is 0.003 \( \mu \)g/L aldrin/dieldrin.

\( \mu \)g/L - micrograms per liter
NNS - No numeric standard
D - Dissolved
T - Total recoverable
TTHM - indicates that the chemical is a trihalomethane. See Trihalomethanes, Total for DWS standard.

Table 3. Acute Water Quality Standards for dissolved Cadmium
Aquatic and Wildlife ephemeral
No change to Table

Table 4. Acute Water Quality Standards for dissolved Cadmium
Aquatic and Wildlife coldwater, warmwater and edw
No change to Table

Table 5. Chronic Water Quality Standards for dissolved Cadmium
Aquatic and Wildlife coldwater, warmwater and edw
No change to Table

Table 6. Acute Water Quality Standards for dissolved Chromium III
Aquatic and Wildlife ephemeral
No change to Table

Table 7. Acute Water Quality Standards for dissolved Chromium III
Aquatic and Wildlife coldwater, warmwater and edw
No change to Table

Table 8. Chronic Water Quality Standards for dissolved Chromium III
Aquatic and Wildlife Coldwater, warmwater and edw
No change to Table

Table 9. Chronic Water Quality Standards for dissolved Copper
Aquatic and Wildlife coldwater, warmwater and edw
No change to Table
Table 10. Acute Water Quality Standards for dissolved Copper
Aquatic and Wildlife ephemeral
No change to Table

Table 11. Acute Water Quality Standards for dissolved Copper
Aquatic and Wildlife coldwater, warmwater and edw
No change to Table

Table 12. Acute Water Quality Standards for dissolved Nickel
Aquatic and Wildlife ephemeral
No change to Table

Table 13. Acute Water Quality Standards for dissolved Lead
Aquatic and Wildlife ephemeral
No change to Table

Table 14. Acute Water Quality Standards for dissolved Lead
Aquatic and Wildlife Coldwater, warmwater and edw
No change to Table

Table 15. Chronic Water Quality Standards for dissolved Lead
Aquatic and Wildlife coldwater, warmwater and edw
No change to Table

Table 16. Acute Water Quality Standards for dissolved Nickel
Aquatic and Wildlife coldwater, warmwater and edw
No change to Table

Table 17. Chronic Water Quality Standards for dissolved Nickel
Aquatic and Wildlife coldwater, warmwater and edw
No change to Table

Table 18. Water Quality Standards for dissolved Silver
Aquatic and Wildlife coldwater, warmwater, edw and ephemeral
No change to Table

Table 19. Acute Water Quality Standards for dissolved Zinc
Aquatic and Wildlife ephemeral
No change to Table

Table 20. Acute and Chronic Water Quality Standards for dissolved Zinc
Aquatic and Wildlife coldwater, warmwater and edw
No change to Table
### Table 21. Water Quality Standards for Pentachlorophenol

**Acute Aquatic and Wildlife coldwater, warmwater, and edw**

No change to Table

### Table 22. Water Quality Standards for Pentachlorophenol

**Chronic Aquatic and Wildlife coldwater, warmwater, and edw**

No change to Table

### Table 23. Water Quality Standards for Pentachlorophenol

**Acute Aquatic and Wildlife ephemeral**

No change to Table

### Table 24. Acute Criteria for Total Ammonia (in mg N/L)

No change to Table

### Table 25. Chronic Criteria for Total Ammonia (in mg N/L) for A&Wc and A&Ww Designated Uses

No change to Table