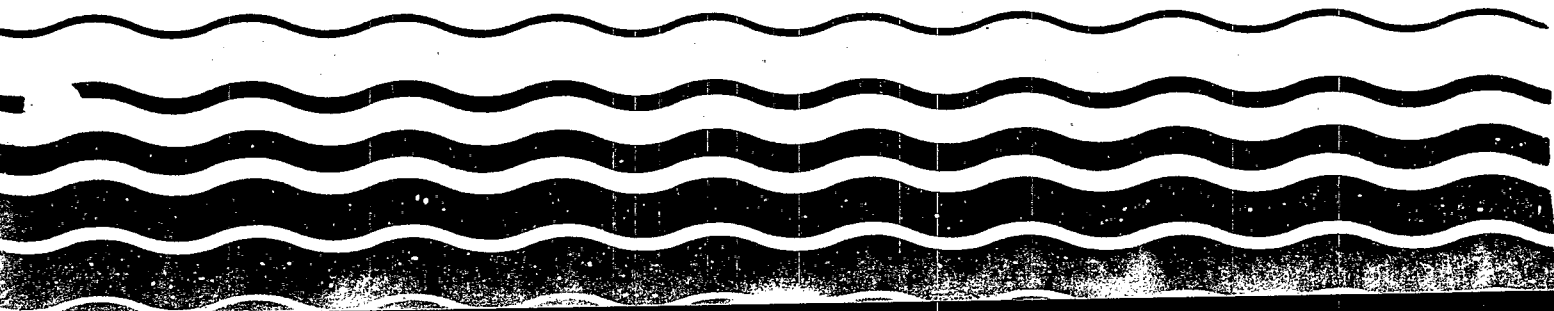


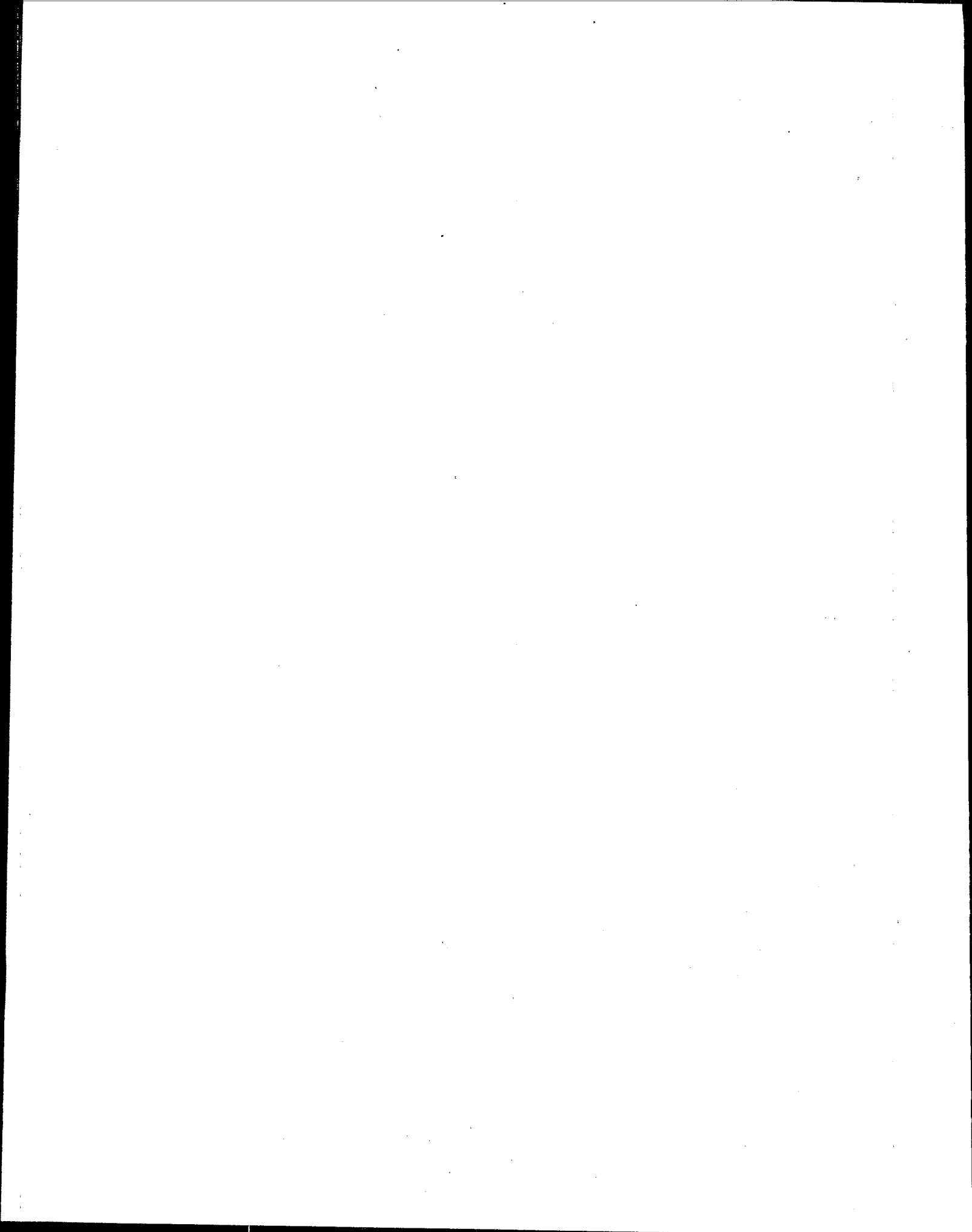
Water

Pesticides

Water Quality Standards Criteria Summaries: A Compilation of State/Federal Criteria

EPA





DISCLAIMER

This publication was prepared by Battelle under contract to the U.S. Environmental Protection Agency (Contract 68-03-3534). Secondary information sources were used to compile data presented in this document. Each State was given an opportunity to review and provide comments on a draft of this information document. In no event shall either the United States or Battelle have any responsibility or liability for any use, misuse, or reliance upon the information contained herein, nor does either warrant or otherwise represent in any way the accuracy, adequacy, efficacy, or applicability of the contents hereof.

The reader should consult the water quality standards of a particular State for exact regulatory language applicable to that State. Copies of State water quality standards may be obtained from the State's Water Pollution Control Agency or its equivalent.

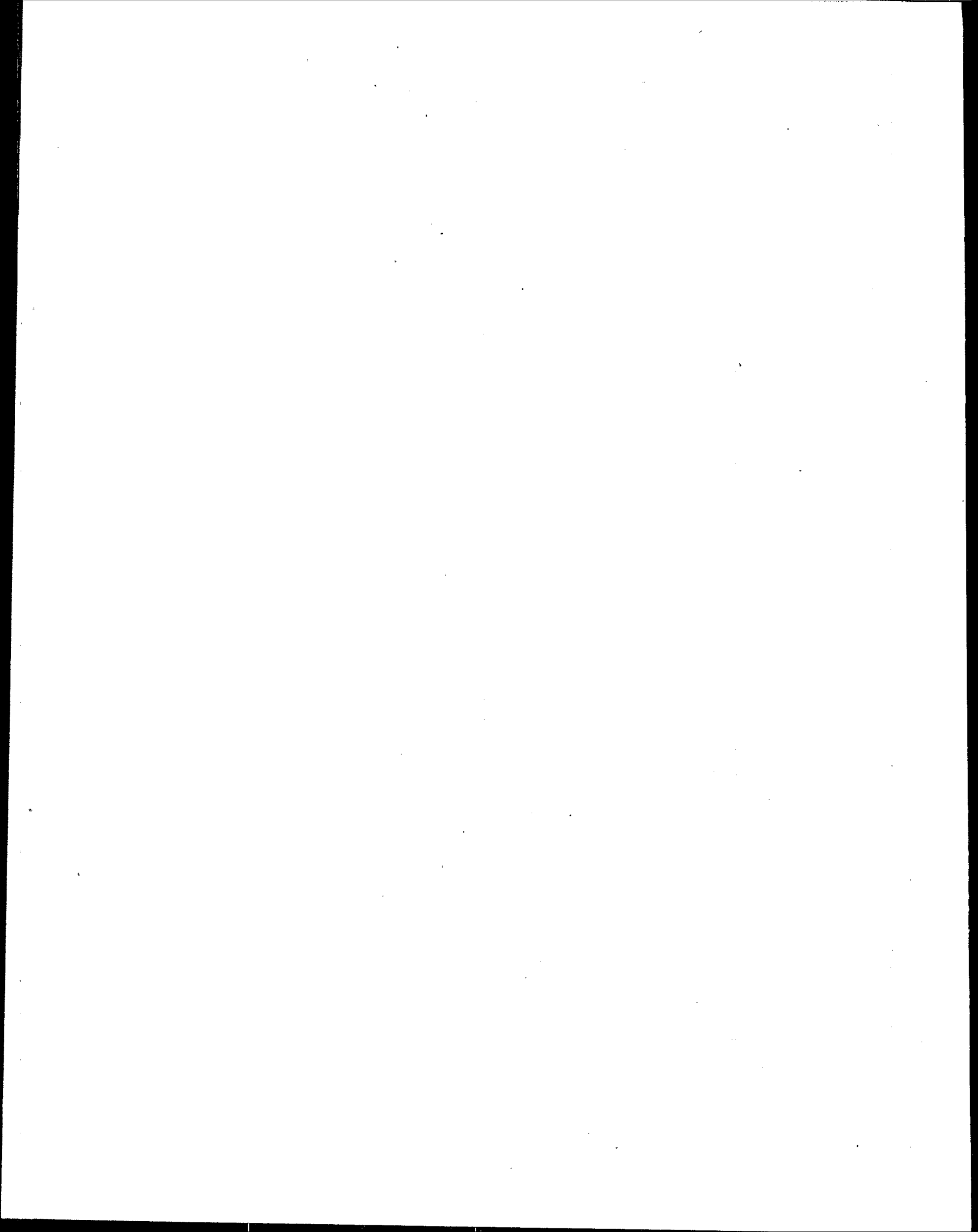
Additional information may also be obtained from the;

Standards Branch
Criteria and Standards Division (WH-585)
Office of Water Regulations and Standards
U.S. Environmental Protection Agency
Washington, D.C. 20460
202-475-7315

This document may be obtained only from the National Technical Information Service (NTIS) at the following address:

National Technical Information Service
5285 Front Royal Road
Springfield, Virginia 22161
703-487-4650

The NTIS order number is: PR89-141535



INTRODUCTION

This digest is compiled to provide general information to the public as well as to Federal, State, and local officials. It contains excerpts from the individual Federal-State water quality standards establishing pollutant specific criteria for interstate surface waters. The water quality standards program is implemented by the U. S. Environmental Protection Agency where responsibility for providing water quality recommendations, approving State-adopted standards for interstate waters, evaluating adherence to the standards, and overseeing enforcement of standards compliance, has been mandated by Congress.

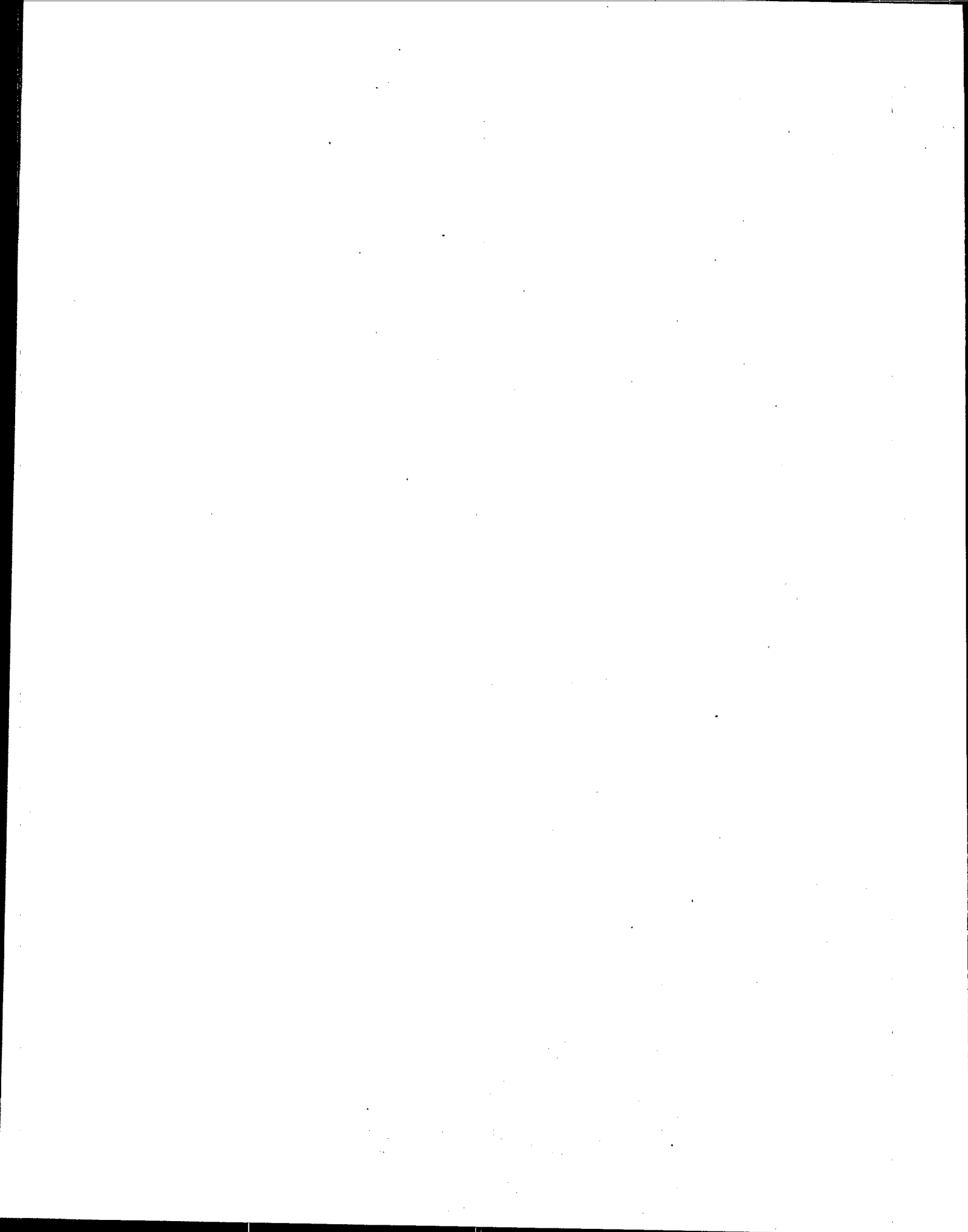
Standards, a nationwide strategy for surface water quality management, contain three major elements: the use (recreation, drinking water, fish and wildlife propagation, industrial, or agricultural) to be made of the navigable water; criteria to protect these uses; and an antidegradation statement to protect existing high quality waters, from degradation by the addition of pollutants. Guidance for the development of standards by individual States is contained in two EPA documents entitled Water Quality Standards Handbook (1983) and Quality Criteria for Water (1986).

This digest summarizes fifteen pesticides which are usually incorporated into State Water Quality Standards and for which EPA has recommended criteria in QCV. These pesticides are: Aldrin/dieldrin, chlordane, chlorophenoxy herbicides, DDT, demeton, endosulfan, endrin, guthion, heptachlor, lindane, malathion, methoxychlor, mirex, parathion, and toxaphene. All of these chemicals are man-made for the control of insects, fungus and other plant and animal diseases or disease vectors. The presence of any of these substances in national waters are a result of an intrusion from non-point sources associated with agricultural or forestry application and point source production facility effluents. To control the presence of aldrin/dieldrin, DDT (DDD and DDE), endrin and toxaphene in water, EPA promulgated effluent standards for manufacturers of these pesticides (40 CFR 129).

All of these substances exert detrimental effects on aquatic and animal life; some are suspected mutagens or carcinogens. For these reasons EPA recommended the ambient water quality criteria presented below. All criteria in this document represent the maximum concentration permissible unless otherwise noted.

Aldrin	Freshwater Aquatic Life -	4.0 ug/L
	Saltwater Aquatic Life -	1.3 ug/L
Dieldrin	Freshwater Aquatic Life -	0.0019 ug/L (24-hour avg)
		1.0 ug/L
	Saltwater Aquatic Life -	0.0019 ug/L (24-hour avg)
		0.71 ug/L

For the maximum protection of human health from the potential carcinogenic effects of exposure to aldrin and dieldrin through ingestion of contaminated water and contaminated aquatic organisms, the ambient water



concentration should be zero, based on the nonthreshold assumption for these chemicals.

Chlordane

Freshwater Aquatic Life - 0.0043 µg/L (24-hour avg)
2.4 µg/L

Saltwater Aquatic Life - 0.0040 µg/L (24-hour avg)
0.09 µg/L

For the maximum protection of human health from the potential carcinogenic effects of exposure to chlordane through ingestion of contaminated water and contaminated aquatic organisms, the ambient water concentration should be zero based on the nonthreshold assumption for this chemical.

**Chlorophenoxy
Herbicides**

Domestic Water Supply:

2,4-D 100 µg/L

2,4,5-TP 10 µg/L

DDT and Metabolites

Freshwater Aquatic Life - 0.0010 µg/L (24-hour avg)
1.1 µg/L

Saltwater Aquatic Life - 0.0010 µg/L (24-hour avg)
0.13 µg/L

For the maximum protection of human health from the potential carcinogenic effects of exposure to DDT through ingestion of contaminated water and contaminated aquatic organisms, the ambient water concentration should be zero, based on the nonthreshold assumption for this chemical.

Demeton

Freshwater and Marine Aquatic Life - 0.1 µg/L

Endosulfan

Freshwater Aquatic Life - 0.056 µg/L (24-hour avg)
0.22 µg/L

Saltwater Aquatic Life - 0.0087 µg/L (24-hour avg)
0.034 µg/L

For the protection of human health from the toxic properties of endosulfan ingested through water and contaminated aquatic organisms, the ambient water criterion is determined to be 74 µg/L.

For the protection of human health from the toxic properties of endosulfan ingested through contaminated aquatic organisms alone, the ambient water criterion is determined to be 159 µg/L.

Endrin

Freshwater Aquatic Life - 0.0023 µg/L (24-hour avg)
0.18 µg/L

	Saltwater Aquatic Life - 0.0023 ug/L (24-hour avg) 0.037 ug/L
	Human Health - 1.0 ug/L
Guthion	Freshwater and Marine Aquatic Life - 0.01 ug/L
Heptachlor	Freshwater Aquatic Life - 0.0038 ug/L (24-hour avg) 0.52 ug/L
	Saltwater Aquatic Life - 0.0036 ug/L (24-hour avg) 0.053 ug/L
For the maximum protection of human health from the potential carcinogenic effects of exposure to heptachlor through the ingestion of contaminated water and contaminated aquatic organisms, the ambient water concentration should be zero, based on the nonthreshold assumption for this chemical.	
Lindane	not specified
Malathion	Freshwater and Marine Aquatic Life -- 0.1 ug/L
Methoxychlor	Freshwater and Marine Aquatic Life - 0.03 ug/L
	Domestic Water Supply - 100 ug/L
Mirex	Freshwater and Marine Aquatic Life - 0.001 ug/L
Parathion	Freshwater and Marine Aquatic Life - 0.04 ug/L
Toxaphene	Freshwater Aquatic Life - 0.013 ug/L (24-hour avg) 1.6 ug/L
	Saltwater Aquatic Life - 0.070 ug/L

Since water quality standards experience revisions and upgrading from time to time, the following procedures set forth in the Clean Water Act, individual entries in this digest may be superseded. As these revisions are accomplished and allowing for the States to revise their standards accordingly, this digest will be updated and reissued. Because this publication is not intended for use other than as a general information resource, to obtain the latest information and for special purposes and applications, the reader needs to refer to the current approved water quality standards. These can be obtained from the State water pollution control agencies or the EPA or Regional Offices.

REFERENCES

- 3 Water Quality Boundaries and Standards (Arizona), Article 2. Surface Water Quality Standards, A.R.S R18.11, 1987.
 - 5 California Water Quality Standards by River Basins, ca. 1975
- For more detailed information on selected basins, sub-basins and stretches of streams and coastal areas refer to California State Water Quality Standards.
- 12 Idaho Department of Health and Welfare Rules and Regulations, Title 1, Chapter 2, "Water Quality Standards and Wastewater Treatment Requirements", 1980.
 - 25 Missouri Water Quality Standards, 10 CSR 20-7.031, Rule of Department of Natural Resources: Division 20 - Clean Water Commission.
 - 31 Water Quality Standards for Interstate and Intrastate Streams in New Mexico, State of New Mexico Water Quality Control Commission, 1988.
 - 35 Ohio Water Quality Standards, Chapter 3745-1 of the Administrative Code, Ohio Environmental Protection Agency, 1985.
 - 42 Tennessee's Water Quality Criteria and Stream Use Classifications for Interstate and Intrastate Streams, Tennessee Water Quality Control Board: Department of Health and Environment, 1987.
 - 43 Texas Surface Water Quality Standards, Texas Water Commission, Rule Change, 1988.
 - 44 Utah Standards of Quality for Waters of the State, Wastewater Disposal Regulations: Part II, State of Utah Department of Health: Division of Environmental Health, 1988.
 - 46 Virginia Water Quality Standards, State Water Control Board, 1987.
 - 51 Water Quality Standards for American Samoa, 1984, p. 19.
 - 52 Water Quality Standards of the District of Columbia, Chapter 42, Notice of Emergency and Proposed Rulemaking, Department of Consumer and Regulatory Affairs, p. 16
 - 53 Revised Guam Water Quality Standards, Guam Environmental Protection Agency, 1984, p. 11-12.
 - 54 Commonwealth of Northern Marianas Islands Marine and Fresh Water Quality Standards, Commonwealth Register, Vol. 8 No. 5, 1986, p. 4464-4468.
 - 55 Puerto Rico Water Quality Standards Regulation, Environmental Quality Board, 1983.

- 56 Marine and Fresh Water Quality Standard Regulations, Trust Territory, 1986, p. 8-10.
- 57 Water Quality Standards for Coastal Waters of the Virgin Islands, Title 12, Chapter 7, Subchapter 186, 1985, p. 263.

ENVIRONMENT REPORTER, The Bureau of National Affairs, Inc., Washington, D.C.
20037

- 1 Pages 701:1003-1010, June 26, 1981
- 2 Pages 706:1003-1009, November 7, 1986
- 4 Page 716:1005, August 30, 1985
- 6 Pages 726:1005-1006, August 22, 1986
- 7 Page 731:1002, May 14, 1982
- 8 Pages 736:1007-1010, March 28, 1986
- 9 Pages 746:1011-1013, January 21, 1983
- 10 Pages 751:0503-0505, December 27, 1985
- 11 Page 756:1002, September 20, 1985
- 13 Pages 766:0505-0506, :0514, March 28, 1986; 766:0507-0508, May 25, 1984
- 14 Pages 771:1002, :1013-1017, January 10, 1986; 771:1003-1006, August 10, 1984; 771:1007-1009, December 26, 1980
- 15 Pages 776:1005-1006, February 13, 1987
- 16 Pages 781:1011-1012, March 27, 1987
- 17 Pages 786:1007-1009, November 29, 1985
- 18 Pages 791:1005-1006, :1008-1009, January 18, 1985
- 19 Pages 796:0104-0108, April 18, 1986
- 20 Page 801:1002, April 19, 1985
- 21 Page 806:1002, June 21, 1985
- 22 Pages 811:1003-1004, February 13, 1987
- 23 Pages 816:1003-1006, :1009-1010, June 25, 1982
- 24 Pages 821:1002-1003, October 25, 1985
- 26 Pages 831:1004-1009, April 19, 1985

- 27 Pages 836:1003-1006, March 27, 1987
- 28 Pages 841:1001, :1011, :1013, :1087, February 22, 1985; 841:1005, :1008, :1026, :1065, June 29, 1984
- 29 Pages 846:1002-1004, :1008-1009, October 5, 1984
- 30 Pages 851:1004, :1009-1010, :1018-1019, :1021, April 11, 1986
- 32 Page 861:1007-1028, November 29, 1985
- 33 Pages 866:1006, December 27, 1985; 866:1010-1013, August 29, 1986
- 34 Pages 871:1002-1004, June 7, 1985
- 36 Pages 881:1003-1008, :1014, September 26, 1986
- 37 Page 886:1007, May 9, 1986
- 38 Pages 891:1004-1009, August 9, 1985
- 39 Pages 901:1002-1005, :1012-1016, August 9, 1985
- 40 Pages 906:1004, :1006-1009, November 29, 1985
- 41 Pages 911:1003-1005, March 22, 1985
- 45 Page 931:1006, March 22, 1985
- 47 Pages 941:1003-1005, October 21, 1983
- 48 Pages 946:1002, :1009, August 10, 1984
- 49 Page 951:1002, March 13, 1987
- 50 Page 956:1005, July 5, 1985
- 52 Page 741:1002-1005, March 28, 1986

State and Water Use

Criteria Values

Alabama¹

All

Public Water Supply

Not specified

Toxic substances narrative: Only such amounts, whether alone or in combination with other substances as will not render the waters unsafe or unsuitable as a source of water supply for drinking or food-processing purposes, or injurious to fish, wildlife and aquatic life, or adversely affect the aesthetic value of waters for any use under this classification.

Swimming and Other
Whole Body

Water-Contact Sports

Toxic substances narrative: Only such, whether alone or in combination with other substances or wastes, as will not render the water unsafe or unsuitable for swimming and water-contact sports; be injurious to fish, wildlife and aquatic life or, where applicable, shrimp and crabs; impair the palatability of fish, or where applicable, shrimp and crabs; impair the waters for any other usage established for this classification or unreasonably affect the aesthetic value of waters for any use under this classification.

Shellfish Harvesting

Toxic substances narrative: Only such amounts, whether alone or in combination with other substances, as will not be injurious to fish and aquatic life, including shrimp and crabs; affect the marketability of fish and shellfish, including shrimp and crabs; exceed one-tenth of the 96-hour median tolerance limit for fish, aquatic life or shellfish, including shrimp and crabs.

Fish and Wildlife

Toxic substances narrative: Only such amounts, whether alone or in combination with other substances, as will not be injurious to fish and aquatic life, including shrimp and crabs in estuarine or salt waters or the propagation thereof; not to exceed one-tenth of the 96-hour median tolerance limit for fish and aquatic life, including shrimp and crabs in salt and estuarine waters, except that other limiting concentrations may be used when factually justified and approved by the Commission.

Agricultural &
Industrial Water
Supply

Toxic substances narrative: Only such amounts as will not render the waters unsuitable for agricultural irrigation, livestock watering, industrial cooling, industrial process water supply purposes, and fish survival, nor interfere with downstream water uses.

Industrial Operations

Toxic substances narrative: Only such amounts as will not render the waters unsuitable for industrial cooling and industrial process water supply purposes, nor interfere with downstream water uses.

State and Water Use

Criteria Values

Navigation

Toxic substances narrative: Only such amounts as will not render the waters unsuitable for agricultural irrigation, livestock watering, industrial cooling, and industrial process water supply purposes, where applicable, nor interfere with downstream water use.

Alaska²

All

Not specified

I. Fresh Water

(A) Water Supply

(i) Drinking,

Culinary & Food
Processing.

Toxic substances narrative: Shall not exceed Alaska Drinking Water Standards or EPA Quality Criteria for Water.

(ii) Agricultural
incl. Irrigation and
Stock Watering

Toxic substances narrative: Same as I.(A)(i) where contact with a product destined for subsequent human consumption is present. Same as I. (C) or FWPCA Water Quality Criteria(VOC/FWPCA) as applicable to substances for stockwaters. Concentrations for irrigation waters shall not exceed (VOC/FWPCA) or WQC 1972.

(iii) Aquaculture

Toxic substances narrative: Shall not individually or in combination exceed 0.01 times the lowest measured 96-hour LC_{50} for life stages of species identified by the department as being the most sensitive, biologically important to the situation or exceed criteria cited in EPA Quality Criteria for Water or Alaska Drinking Water Standards whichever concentration is less. Substances shall not be present or exceed concentrations which individually or in combination impart undesirable odor or taste to fish or other aquatic organisms as determined by either bioassay or organoleptic tests.

(iv) Industrial,
Including Any Water
Supplies Used In Asso-
ciation With A Manu-
facturing Or Production
Enterprise (other than
Food Processing), In-
cluding Mining, Placer
Mining, Energy Produc-
tion Or Development.

Toxic substances narrative: Substances shall not be present which pose hazards to worker contact.

State and Water Use

Criteria Values

(B) Water Recreation

(i) Contact
Recreation.

Toxic substances narrative: Same as I.(A)(i).

(ii) Secondary
Recreation

Toxic substances narrative: Substances shall not be present which pose hazards to incidental human contact.

(C) Growth And Propagation Of Fish, Shellfish, Other Aquatic Life, And Wildlife Including Waterfowl And Furbearers

Toxic substances narrative: Shall not individually or in combination exceed 0.01 times the lowest measured 96-hour LC50 for life stages of species identified by the department as being the most sensitive, biologically important to the location, or exceed criteria cited in EPA Quality Criteria for Water or Alaska Drinking Water Standards whichever concentration is less. Substances shall not be present or exceed concentrations which individually or in combination impart undesirable odor or taste to fish or other aquatic organisms as determined by either bioassay or organoleptic tests.

II. Marine Water

(A) Water Supply

(i) Aquaculture

Toxic substances narrative: Same as I.(A)(iii).

(ii) Seafood
Processing

Toxic substances narrative: Shall not exceed EPA Quality Criteria for Water as applicable to the substance.

(iii) Industrial, Including Any Water Supplies Used In Association With A Manufacturing Or Production Enterprise (other than Food Processing) Including Mining, Placer Mining, Energy Production Or Development.

Toxic substances narrative: Same as I.(A)(iv).

(B) Water Recreation

(i) Contact
Recreation

Toxic substances narrative: Shall not exceed EPA, Quality Criteria for Water as applicable to constituent.

(ii) Secondary
Recreation

Toxic substances narrative: Same as I.(B)(ii).

(C) Growth And Propagation Of Fish, Shellfish, Aquatic Life And Wildlife Including Seabirds, Waterfowl And Furbearers.

Toxic substances narrative: Same as I.(C).

State and Water UseCriteria Values

(D) Harvesting For
Consumption Of Raw
Mollusks Or Other Raw
Aquatic Life

Toxic substances narrative: Same as I.(C) but
excluding the phrase "or Alaska Drinking Water
Standards."

Arizona³

All Surface Water

Aldrin/Dieldrin	0.003	(maximum ug/L)
DDT, DDD, and DDE	0.001	
Endrin	0.004	
Toxaphene	0.005	
Benzidene	0.10	

Toxic substances narrative: All surface waters shall be free from toxic, corrosive, or other deleterious substances attributable to domestic or industrial waste or other controllable sources at levels or in combinations sufficient to be toxic to human, animal, plant, or aquatic life. With respect to fish toxicity, receiving waters outside mixing zones shall not have a concentration of toxic materials exceeding 1/10 of the 96-hour LC50, where the bioassay is conducted using fish inhabiting the receiving waters and where water quality conditions (temperature, hardness, pH, dissolved oxygen, etc.) approximate those of the stream or lake as closely as practical. The survival of the test organisms shall not be less than that of the control organisms exposed to an appropriate water sample. No person shall cause toxic substances to be present at concentrations which interfere with designated protected uses.

Arkansas⁴

All

<u>Substance</u>	<u>Chronic Toxicity</u> (24hr avg- ug/l)	<u>Acute Toxicity</u> (never exceed- ug/l)
Aldrin	0.014	2.0
Dieldrin	0.0019	3.0
DDT (& metabol.)	0.0010	1.1
Endrin	0.0023	0.18
Toxaphene	0.0002 (4-day avg)	0.73 (1-hr avg)
Chlordane	0.0043	2.4
Endosulfan	0.056	0.22
Heptachlor	0.0038	0.52
Pentachlorophenol	e[1.005(pH)-5.290] (4-day avg.)	e[1.005(pH)-4.830]

All

Toxic materials shall not be present in receiving waters, after mixing, in such quantities as to be toxic to human, animal, plant or aquatic life or to interfere with the normal propagation, growth and

State and Water UseCriteria Values

survival of the indigenous aquatic biota. Within the mixing zone there may be a zone of initial dilution which exceeds the acute toxicity. In no instance shall the entire mixing zone be acutely toxic. Compounds known to be persistent, cumulative, carcinogenic or to exhibit synergism with other waste or stream components shall be addressed on a case-by-case basis. Permitting of all toxic materials shall be in accordance with the toxic implementation strategy found in the Continuing Planning Process.

California⁵All

No individual pesticide or combination of pesticides shall be present in concentrations that adversely affect beneficial uses. There shall be no bioaccumulation in pesticide concentrations found in bottom sediments or aquatic life.

Total identifiable chlorinated hydrocarbon pesticides shall not be present at concentrations detectable within the accuracy of analytical methods prescribed in Standards Methods for the Examination of Water and Wastewater, latest edition, or other equivalent methods approved by the Executive Officer.

Colorado⁵Aquatic Life
Class 1

Aldrin ⁽²⁾	0.000003 ⁽³⁾
Dieldrin ⁽²⁾	0.000003 ⁽³⁾
DDT(DDD & DDE) ⁽²⁾	0.000001
Endrin	0.000004
Heptachlor ⁽²⁾	0.000001
Lindane	0.00001
Methoxychlor	0.00003
Nirex	0.000001
Toxaphene	0.000005
Demeton	0.0001
Endosulfan	0.000003
Guthion	0.00001
Malathion	0.0001
Parathion	0.00004

Drinking Water Supply

Chlordane	0.000004
Endrin	0.02
Lindane	0.004
Methoxychlor	0.1
Toxaphene	0.005
2,4-D	0.1

State and Water Use

Criteria Values

All

Except where authorized by permits, BMP's or plans of operation approved by the Division, State waters shall be free from substances attributable to human-caused point source or nonpoint source discharges in amounts, concentrations or combinations which are harmful to beneficial uses or toxic to humans, animals, plants, or aquatic life.

Footnotes:

(2) The persistence, bioaccumulative potential, and carcinogenicity of these organic compounds cautions human exposure to a minimum (EPA).

(3) Aldrin and dieldrin in combination should not exceed 0.000003 mg/l.

Connecticut⁷

All

Not specified

All

Toxic substances narrative: General Policy 11. The waters shall be free from chemical constituents in concentrations or combinations which would be harmful to human, animal or aquatic life for the most sensitive and governing water use class. Criteria for chemical constituents contained in guidelines published by the U.S. Environmental Protection Agency shall be considered. In areas where fisheries are the governing consideration and numerical limits have not been established, bioassays may be necessary to establish limits on toxic substances. The recommendations for bioassay procedures contained in "Standard Methods for the Examination of Water and Wastewater" and the application factors contained in EPA water quality guidelines shall be considered. For surface waters classified as public drinking water, the raw water sources must be maintained at a quality as defined by criteria developed by the U.S. EPA in accordance with the Safe Drinking Water Act (PL 93-523) or state limits, whichever is more stringent, so that criteria for finished water can be met after conventional treatment.

Coastal And Marine
Water Uses

Toxic substances narrative: None in concentrations or combinations which would be harmful to human, animal or aquatic life or which would make the waters unsafe or unsuitable for fish or shellfish or their propagation, impair the palatability of same, or impair the waters for any other uses. (See General Policy 11.. above)

State and Water UseCriteria ValuesDelaware⁸

All

Not specified

General Stream Criteria Toxic substances narrative: All surface waters if the State shall be free from substances attributable to wastes of industrial, municipal, agricultural or other anthropogenic origin, such as any pollutants, including those of a toxic nature, that may interfere with attainment of designated uses of the water, impart undesirable odors, tastes, or colors to the water or to aquatic, life found therein, endanger public health, or result in dominance of nuisance species.

Stream Quality Criteria Toxic substances narrative: None in concentrations (General Criteria For that may interfere with attainment of designated uses Freshwater and Salt- of the water, endanger public health, or result in water Streams) dominance of nuisance species. The following EPA publications, or any other sources deemed acceptable by the Department, may be used as guidelines for applying these Standards to discharges in the State:

(1) Water Quality Criteria 1972 (March, 1973),

(2) Quality Criteria For Water (July, 1976),

(3) Water Quality Criteria Documents, (EPA-440/5-80-015 through 5-80-079), published in 1980,

(4) Water Quality Criteria Documents, (EPA-440/5-84-028 through 5-84-033, and 5-85-001), published in 1985.

Public Water Supply

Waters shall be free from substances (except natural impurities) that, alone or in combination with other substances, result in concentrations of toxic substances in the treated water that may be harmful to human health. The EPA Water Quality Criteria Documents, (EPA-440/5-80-015 through 5-80-079) published in 1980, (or other sources as determined by the Department) shall be used as guidelines in the determination of acceptable concentrations.

ERES Waters

Toxic substances narrative: Shall not exceed natural levels.

(ERES = Exceptional Recreational or Ecological Significance)

Florida⁹

Class I (PWS)

Aldrin + Dieldrin 0.003
Chlordane 0.01

(maximum ug/L)

State and Water UseCriteria Values

2-4 D	100
2,4,5-TP	10
DDT	0.001
Demeton	0.1
Endosulfan	0.003
Endrin	0.004
Guthion	0.01
Heptachlor	0.001
Lindane	0.01
Malathion	0.10
Methoxychlor	0.03
Mirex	0.001
Parathion	0.04
Toxaphene	0.005

Class II

Aldrin + Dieldrin	0.003	(maximum ug/L)
Chlordane	0.004	
DDT	0.001	
Demeton	0.10	
Endosulfan	0.001	
Endrin	0.004	
Guthion	0.01	
Heptachlor	0.001	
Lindane	0.004	
Malathion	0.10	
Methoxychlor	0.03	
Mirex	0.001	
Parathion	0.04	
Toxaphene	0.005	

Class III

Aldrin + Dieldrin	0.003	(maximum ug/L)
Chlordane	0.01 (fresh)	
	0.004 (marine)	
DDT	0.001	
Demeton	0.10	
Endosulfan	0.003 (fresh)	
	0.001 (marine)	
Endrin	0.004	
Guthion	0.01	
Heptachlor	0.001	
Lindane	0.01 (fresh)	
	0.004 (marine)	
Malathion	0.10	
Methoxychlor	0.03	
Mirex	0.001	
Parathion	0.04	
Toxaphene	0.005	

All

Minimum criteria for surface waters: All surface waters of the State shall at all times at all places be free from:

Domestic, industrial, agricultural, or other

State and Water Use

Criteria Values

man-induced non-thermal components of discharges which, alone or in combination with other substances or in combination with other components of discharges (whether thermal or non-thermal);

Are acutely toxic; or

Are present in concentrations which are carcinogenic, mutagenic, or teratogenic to human beings or to significant, locally occurring, wildlife or aquatic species; or

Pose a serious danger to the public health, safety, or welfare.

All

General criteria for toxic substances (applied to all surface waters except within zones of mixing): Substances in concentrations which injure, are chronically toxic to, or produce adverse physiological or behavioral response in humans, animals, or plants - none shall be present.

Georgia¹⁰

All (except mixing zones)

Endrin*	0.002 ug/L
Lindane	0.08 ug/L
Methoxychlor*	0.03 ug/L
2,4-D	100 ug/L

*The criteria for these constituents are lower than the conventional laboratory detection limits.

All

Toxic substances narrative: All waters shall be free from toxic substances discharged from municipalities, industries or other sources in amounts, concentrations or combinations which are harmful to humans, animals or aquatic life.

Drinking Water

Toxic substances narrative: No material or substance in such concentration that, after treatment, would exceed the requirements of the Environmental Protection Division and the latest edition of Federal Drinking Water Standards.

Recreation, Fishing, Propagation Of Fish, Shellfish, Game And Other Aquatic Life.

Toxic wastes narrative: None in concentrations that would harm man, fish and game or other beneficial aquatic life.

Agricultural

Toxic substance narrative: None in concentrations that would interfere with or adversely affect uses for general agricultural purposes or would prevent fish survival.

State and Water UseCriteria Values

Industrial

Toxic substance narrative: None in concentrations that would prevent fish survival or interfere with legitimate and beneficial industrial uses.

Navigation

Toxic substance narrative: None in concentrations that would damage vessels, prevent fish survival or otherwise interfere with commercial navigation.

Hawaii¹¹

All

Not specified

All

Toxic substances narrative: All waters shall be free of substances attributable to domestic, industrial, or other controllable sources as follows: toxic substances at levels or combinations sufficient to be toxic or harmful to human, animal, plant or aquatic life or in amounts sufficient to interfere with any beneficial use of the water.

As a minimum, a phytoplankton bioassay test or a 96-hour bioassay shall be required. Survival of test organisms shall not be less than that in controls which utilize appropriate experimental water.

Idaho¹²

Domestic Water Supply

Endrin	0.0002	(maximum mg/L)
Lindane	0.004	
Methoxychlor	0.100	
Toxaphene	0.005	
Trihalomethanes	0.100	
2,4-D	0.100	
2,4,5-TP Silvex	0.010	

All

The following general water quality standards will apply to waters of the State, both surface and underground, in addition to the water quality standards set forth for specifically classified waters. As a result of man-caused point or nonpoint source discharge, waters of the State must not contain:

.01 Hazardous Materials: (see Section 01-2003,19.) in concentrations found to be of public health significance or to adversely affect designated or protected beneficial uses.

.02 Deleterious Materials: (see Section 01-2003,07.) in concentrations that impair designated or protected beneficial uses without being hazardous.

Illinois¹³

General Use

Toxic substances narrative: Any substance toxic to aquatic life shall not exceed one-tenth of the 96-hour median tolerance limit (96-hr. TL_m) for native fish or essential fish food organisms, except for USEPA registered pesticides approved for aquatic application and applied pursuant to specified conditions.

Applications of aquatic pesticides must be in accordance with the laws, regulations and guidelines of all state and federal agencies authorized by law to regulate, use or supervise pesticide applications, among which are included the Illinois Department of Agriculture and the Illinois Department of Public Health pursuant to Ill. Rev. Stat. 1979 ch. 5, pars. 256 through 267; and the Department of Energy and Natural Resources pursuant to Ill. Rev. Stat. 1979 ch. 96 1/2, par. 7403.

No aquatic pesticide shall be applied to waters affecting public or food processing water supplies unless a permit to apply the pesticide has been obtained from the Agency. All permits shall be issued so as not to cause a violation of the Act or of any of the Board's rules or regulations. To aid applicators in determining their responsibilities under this subsection, a list of waters affecting public water supplies will be published and maintained by the Agency's Division of Public Water Supplies.

Public and Food
Processing Water
SupplyChlorinated Hydrocarbon Insecticides

Aldrin	0.001	(maximum mg/L)
Chlordane	0.003	
DDT	0.050	
Dieldrin	0.001	
Endrin	0.0002	
Heptachlor	0.0001	
Heptachlor Epoxide	0.0001	
Lindane	0.004	
Methoxychlor	0.1	
Toxaphene	0.005	

Organophosphate Insecticides

Parathion	0.1
-----------	-----

Chlorophenoxy Herbicides

2,4-D	0.1
2,4,5-TP	0.01

State and Water Use

Criteria Values

Indiana¹⁴

All

Not specified

All

Toxic substances narrative: All waters at all times and at all places, including the mixing zone, shall meet the minimum conditions of being free from substances attributable to municipal, industrial, agricultural, and other land use practices or other discharges which are in amounts sufficient to injure, be acutely toxic to or otherwise produce serious adverse physiological responses in humans, animals, aquatic life or plants. As a guideline, toxic substances should be limited to the 96-hour median lethal concentration (LC50) for biota significant to the indigenous aquatic community or other representative organisms.

At all times, all waters outside of mixing zones shall be free of substances in concentrations which on the basis of available scientific data are believed to be sufficient to injure, be chronically toxic to, or be carcinogenic, mutagenic, or teratogenic to humans, animals, aquatic life, or plants.

Aquatic Life

Toxic substances narrative: concentrations shall not exceed one-tenth of the 96-hour median lethal concentration for important indigenous aquatic species or other representative organisms.

Contaminants which are known to be bioaccumulative and toxic, on the basis of available scientific data, shall not be present in concentrations which would result in the bioaccumulation or bioconcentration of such contaminants or their degradation products in important indigenous aquatic species to Federal Food and Drug Administration action levels or levels producing deleterious effects which are prohibited.

Potable Supply

Chemical substances narrative: The chemical constituents in the waters shall not be present after conventional treatment in such levels as to prevent meeting the Drinking Water Standards adopted by the Board.

Lake Michigan and
Contiguous Harbor
Areas

Toxic substances narrative: Concentrations shall not exceed one-tenth of the 96-hour median lethal concentration (LC₅₀) for important indigenous aquatic species and those artificially propagated by the Indiana Department of Natural Resources. More stringent application factors shall be used when justified on the basis of available evidence and approved by the Board after public notice and

State and Water Use

Criteria Values

opportunity for a hearing.

Concentrations of organic contaminants which can be demonstrated to be persistent, to have a tendency to bioconcentrate in the aquatic biota, and are likely to be toxic on the basis of available scientific evidence, shall be limited as determined by the Commissioner after public notice and an opportunity for a hearing.

Grand Calumet River

Toxic substances narrative: Concentrations shall not exceed one-tenth of the 96-hour median lethal concentration (LC_{50}) for important indigenous aquatic species. More stringent application factors shall be used, when justified, on the basis of available scientific evidence and approved by the Board after public notice and opportunity for a hearing.

Organic contaminants which can be demonstrated to be persistent, to have a tendency to bioconcentrate in the aquatic biota, and are likely to be toxic on the basis of available scientific evidence, shall not be present in concentrations which would result in the bioaccumulation or bioconcentration of such contaminants or their degradation products in important indigenous aquatic species to Federal Food and Drug Administration action levels or levels which on the basis of available scientific evidence are believed to be sufficient to injure, be chronically toxic to, or be carcinogenic, mutagenic, or teratogenic to humans, animals, or plants.

Iowa¹⁵

**Wildlife, Fish, Aquatic
And Semiaquatic Life,
Secondary Contact**

Toxic substances narrative: All substances toxic or detrimental to aquatic life shall be limited to non-toxic or non-detrimental concentrations in surface water.

Potable Water Supply

Toxic substances narrative: All substances toxic to humans or detrimental to treatment process shall be limited to non-toxic or non-detrimental concentrations in the surface water.

All

Toxic substances narrative: All waters, at all times, at all places shall be free from substances attributable to wastewater discharges or agricultural practices in concentrations or combinations which are toxic or harmful to human, animal, or plant life.

State and Water UseCriteria ValuesKansas¹⁶

All

Not specified

All

General criteria: All surface waters shall be free, at all times, from the harmful effects of substances that originate from artificial sources and that produce any public health hazards or nuisance conditions, or impairment of uses. The harmful effects may result from any concentration of a substance that causes toxic effects, alone or in combination with other artificial or natural substances. Such substances shall be limited to concentrations in the receiving water that will not be harmful to human, animal, or plant life.

Aquatic Life

Toxic substances narrative:

(ii) The waters of the state shall not be toxic as a result of the effects of substances originating from artificial sources, whether alone or in combination with other artificial or natural substances.

(iii) Criteria for the protection of predators, in terms of toxic levels in fish, published in "Water Quality Criteria" (National Academy of Engineering, 1973), which is hereby adopted by reference, shall be used as guidelines in assessing toxicity due to bioaccumulation.

(iv) When criteria for single compounds have not been published or are incomplete, or when complex mixtures can result in interactions among substances, the department shall utilize laboratory and field bioassessment methods and procedures to establish site-specific water quality criteria.

Aldrin	0.003	(maximum µg/L)
Chlordane	0.0043	
DDT	0.001	
Dieldrin	0.0019	
Endosulfan	0.056	
Endrin	0.0023	
Heptachlor	0.0038	
Lindane	0.08	
Methoxychlor	0.03	
Parathion	0.04	
Toxaphene	0.013	

Domestic Water Supply

Any concentration of a substance from artificial sources that, alone or in combination with other artificial or natural substances, causes toxic effects on humans shall be limited to non-harmful concentrations.

State and Water UseCriteria Values

Consumptive Recreation Substances that can bioaccumulate through bioconcentration or biomagnification to toxic levels in aquatic life, semiaquatic life or wildlife consumed by humans shall be limited in surface waters to concentrations that will result in no harm to humans upon consumption. FDA action levels defined in K.A.R. 28-16-28b(b)(19) for toxic substances in fish flesh, which are hereby adopted by reference, shall be used as guidelines to determine protection of this use.

Kentucky¹⁷

All

Surface waters shall not be aesthetically or otherwise degraded by substances that injure, be toxic to or produce adverse physiological or behavioral responses in humans, animals, fish, and other aquatic life.

Warmwater Aquatic
Habitat, Coldwater
Aquatic Habitat

Chlordane 0.0043 ug/L

Toxic substances narrative:

1. The allowable instream concentration of toxic substances which are noncumulative or nonpersistent (half-life of less than 96 hours) shall not exceed 0.1 of the 96-hour median lethal concentration (LC₅₀) of a representative indigenous aquatic organism(s).

2. The allowable instream concentration of toxic substances which are bio-accumulative or persistent, including pesticides, when not specified elsewhere in this section, shall not exceed 0.01 of the 96-hour median lethal concentration (LC₅₀) of a representative indigenous aquatic organism(s).

3. Where specific application factors have been determined for a toxic substance such as an acute/chronic ratio or water effect ratio, they may be used instead of the 0.1 and 0.01 factors listed in this subsection upon approval by the cabinet.

Mixing Zones

Toxic substances narrative: Concentration of toxic substances which exceed the ninety-six (96) hour LC50 tests for representative indigenous aquatic organisms are not allowed at any point within the mixing zone. A zone of initial dilution may be assigned on a case-by-case basis at the discretion of the cabinet. Concentrations of toxic substances which exceed one-third (1/3) the ninety-six (96) hour LC50 or other appropriate LC50 tests for representative indigenous aquatic organisms are to be met at the edge of the zone of initial dilution. Chronic criteria for the protection of aquatic life are to be met at the edge of the allowable mixing zone.

State and Water UseCriteria ValuesLouisiana¹⁸

Fresh Water

DDT	1.1 ^a , 0.001 ^b	(maximum ug/L unless otherwise noted)
TDE(DDD)	0.6 ^a	
DDE	1050.0 ^a	
Endrin	0.18 ^a , 0.0023 ^b	
Toxaphene	1.6 ^a , 0.013 ^b	
Dieldrin	2.5 ^a , 0.0019 ^b	
Aldrin	3.0 ^a	
Chlordane	2.4 ^a , 0.0043 ^b	

Marine Water

DDT	0.13 ^a , 0.001 ^b
TDE(DDD)	3.6 ^a
DDE	14.0 ^a
Endrin	0.037 ^a , 0.0023 ^b
Toxaphene	0.070 ^a
Dieldrin	0.71 ^a , 0.0019 ^b
Aldrin	1.3 ^a
Chlordane	0.09 ^a , 0.0040 ^b

Public Water Supply

DDT	0.24 ng/L ^c
Endrin	1.0 ^c
Toxaphene	7.1 ng/L ^c
Dieldrin	0.71 ng/L ^c
Aldrin	0.74 ng/L ^c
Chlordane	4.6 ng/L ^c
2,4-D	100
2,4,5-TP	10
(Silvex)	

^a The ambient water quality criterion not to be exceeded at any time.

^b The ambient water criterion expressed as a 24-hour average.

^c The ambient water quality criterion.

Aesthetics

Toxic substances narrative: All waters shall be free from such concentrations of substances attributable to waste water or other discharges sufficient to injure, be toxic or produce demonstrated adverse physiological response in humans, animals, fish, shellfish, wildlife, or plants.

All

Toxic substances narrative: Shall not be present in quantities that alone or in combination will be toxic to plant or animal life. Concentrations of persistent toxic substances for which no numerical criteria are given in the Standards shall not exceed the 96-hour LC50/100 (one-hundredth of the 96-hour LC50). Persistent toxic substances are defined herein as

State and Water UseCriteria Values

refractory substances subject to very limited or no biodegradation and/or detoxification and subject to food chain bioaccumulation; they include but are not limited to pesticides, PCB's and heavy metals that are designated by EPA as priority pollutants. Concentrations of non-persistent, biodegradable toxic substances for which no numerical criteria are given in the standards, shall not exceed the 96-hour LC50/10 (one-tenth of the 96-hour LC50). Bioassay techniques comparable with those given in the latest edition of Standards Methods for the Examination of Water and Wastewater will be used in evaluating toxicity using specific methods, dilutions, and species of aquatic animals best suited to the area of concern.

Maine¹⁹

All

Not specified

All

Toxic substances narrative: no waste substances containing chemical constituents which would be harmful to humans, animals or aquatic life.

Maryland²⁰

All

Aldrin/Dieldrin	0.003	(maximum µg/L)
DDT	0.001	
Endrin	0.004	
Toxaphene	0.005	

All

Toxic substances narrative: The waters of this State may not be polluted by high-temperature, toxic, corrosive, or other deleterious substances attributable to sewage, industrial waste, or other waste in concentrations or combinations which:

(a) interfere directly or indirectly with water uses; or

(b) are harmful to human, animal, plant or aquatic life.

Toxic materials criteria are established to protect freshwater aquatic life, saltwater aquatic life or human health.

Massachusetts²¹

All

Not specified

For each class, the most sensitive beneficial uses are

State and Water Use

Criteria Values

identified and minimum criteria for water quality in the water column are established. In interpreting and applying the minimum criteria in 314 CMR 4.03(4), the Division shall consider local conditions including, but not limited to:

- (a) the characteristics of the biological community;
- (b) temperature, weather, flow, and physical and chemical characteristics; and
- (c) synergistic and antagonistic effects of combinations of pollutants.

The Division will use the EPA criteria established pursuant to Section 304(a)(1) of the Federal Act, as guidance in establishing case-by-case discharge limits for pollutants not specifically listed in these standards but included under the heading "Other Constituents" in 310 CMR 4.03(4), for identifying bioassay application factors and for interpretations of narrative criteria. Where the minimum criteria specifically listed by the Division in this part differ from those contained in the federal criteria, the provisions of the specifically listed criteria in these standards shall apply.

All

Toxic substances narrative: Waters shall be free from pollutants in concentrations or combinations that:

- (a) exceed the recommended limits on the most sensitive receiving water use;
- (b) injure, are toxic to, or produce adverse physiological or behavioral responses in humans or aquatic life; or
- (c) exceed site-specific safe exposure levels determined by bioassay using sensitive species.

Michigan²²

All

Not specified

All

R 323.1057 Toxic substances narrative: Rule 57.

(1) Toxic substances shall not be present in the waters of the state at levels which are or may become injurious to the public health, safety, or welfare; plant and animal life; or the designated uses of those waters. Allowable levels of toxic substances shall be determined by the commission using appropriate scientific data.

(2) All of the following provisions apply for purposes of developing allowable levels of toxic substances in the surface waters of the state applicable to point source discharge permits issued pursuant to Act No. 245 of the Public Acts of 1929, as amended, being §323.1 et seq. of the Michigan Compiled Laws:

(a) Water quality-based effluent limits developed pursuant to this subrule shall be used only when they are more restrictive than technology-based limitations required pursuant to R 323.2137 and R 323.2140.

(b) The toxic substances to which this subrule shall apply are those on the 1984 Michigan critical materials register established pursuant to Act No. 245 of the Public Acts of 1929, as amended, being §323.1 et seq. of the Michigan Compiled Laws; the priority pollutants and hazardous chemicals in 40 C.F.R. §122.21, appendix D (1983); and any other toxic substances as the commission may determine are of concern at a specific site.

(c) Allowable levels of toxic substances in the surface water after a discharge is mixed with the receiving stream volume specified in R 323.1082 shall be determined by applying an adequate margin of safety to the MATC, NOAEL, or other appropriate effect end points, based on knowledge of the behavior of the toxic substance, characteristics of the receiving water, and the organisms to be protected.

(d) In addition to restrictions pursuant to subdivision (c) of this subrule, a discharge of carcinogens, not determined to cause cancer by a threshold mechanism, shall not create a level of risk to the public health greater than 1 in 100,000 in the surface water after mixing with the allowable receiving stream volume specified in R 323.1082. The commission may require a greater degree of protection pursuant to R 323.1098 where achievable through utilization of control measures already in place or where otherwise determined necessary.

(e) Guidelines shall be adopted pursuant to Act No. 306 of the Public Acts of 1969, as amended, being §24.201 et seq. of the Michigan Compiled Laws, setting forth procedures to be used by staff in the development of recommendations to the commission on allowable levels of toxic substances and the minimum data necessary to derive such recommendations. The commission may require the applicant to provide the minimum data when otherwise not available for derivation of the allowable levels of toxic

State and Water UseCriteria Values

substances.

(f) For existing discharges, the commission may issue a scheduled abatement permit pursuant to R 323.2145 upon a determination by the commission that the applicant has demonstrated that each of the following conditions is met:

(i) Immediate attainment of the allowable level of a toxic substance is not economically or technically feasible.

(ii) No prudent alternative exists.

(iii) During the period of scheduled abatement, the permitted discharge will be consistent with the protection of the public health, safety, and welfare.

(iv) Reasonable progress will be made toward compliance with this rule over the term of the permit, as provided for in a schedule in the permit.

Minnesota²³

All

For contaminants other than heat, the 96-hour median tolerance limit for indigenous fish and fish food organisms should not be exceeded at any point in the mixing zone.

All

Toxic substances narrative: No discharges at levels acutely toxic to humans or other animals or plant life, or directly damaging to real property.

Agriculture and Wild-life (Class B)

Toxic substances narrative: None at levels harmful either directly or indirectly.

Limited Resource Value Waters

Unspecified substances shall not be allowed in such quantities or concentrations that will impair the specified uses.

Mississippi²⁴

All

Not specified

All

Toxic substances narrative: Waters shall be free from substances attributable to municipal, industrial, agricultural or other discharges in concentrations or combinations which are toxic or harmful to humans, animals or aquatic life.

There shall be no substances added, whether alone or in combination with other substances, that will impair

State and Water UseCriteria Values

the use of waters from that which it is classified. The concentration of toxic pollutants shall not exceed one-tenth (1/10th) of the 96-hour median tolerance limit based on available data. The concentration of toxic pollutants that are cumulative and/or persistent may be further limited on a case-by-case basis, where such data is available.

Available references to be used in determining toxicity limitations shall include, but not be limited to Quality Criteria for Water (Section 304(a)), Federal Regulations under Section 307, and Federal Regulations under Section 1412 of the Public Health Service Act as amended by the Safe Drinking Water Act (Pub. L. 93-523). The use of such information should be limited to that part applicable to the indigenous aquatic community found in the State of Mississippi.

Missouri²⁵

Aquatic Life

DDT	.000024	(max conc. in ug/L)
Endrin	.0023	
Aldrin	.000079	
Dieldrin	.000076	
Heptachlor	.0038	
Methoxychlor	.03	
Mirex	.001	
Toxaphene	.000073	
Lindane(gamma-BHC)	.062	
Chlordane	.00048	
Benzidine	.00053	
Dioxin	.000014	ng/L

Drinking Water Supply

Endrin	1.0	(max conc. in ug/L)
Aldrin	.000074	
Dieldrin	.000071	
Heptachlor	.00028	
Toxaphene	.00071	
Lindane(gamma-BHC)	.0022	
Chlordane	.00046	
Benzidine	.00120	
Dioxin	.000130	ng/L
Pentachlorophenol	pH dependent, see table below:	

pH	Max. Conc.
6.5	3.2
7.0	5.3
7.5	8.7
8.0	14
8.5	23
9.0	39

The waters of the state shall be free from substances

State and Water UseCriteria Values

or conditions that have a harmful effect on human, animal, or aquatic life.

Persistent bioaccumulative, man-made toxic substances are not allowed in the waters of the state. These substances include, but are not limited to: PCB's, DDT, endrin, aldrin, dieldrin, heptachlor, methoxychlor, mirex, toxaphene, lindane (gamma BHC), chlordane, benzidine, dioxin (2,3,4,5,TCDD) and alpha-; beta; delta BHC.

Classified Waters

Toxic substances narrative: Water contaminants shall not cause the limits in Table A for the toxic form of metals and other toxic substances to be exceeded. Concentrations of such substances in bottom sediments or waters shall not harm benthic organisms and shall not accumulate through the food chain in harmful concentrations, nor shall Food and Drug Administration maximum fish tissue levels for fish consumption be exceeded. More stringent criteria may be imposed if there is evidence of additive or synergistic effects. Effluent toxicity studies or site-specific instream biological studies performed, recognized, or sanctioned by the commission may be used to develop alternative effluent limits not based on Table A values.

Persistent, bioaccumulative, man-made toxic substances are not allowed in the waters of the state.

Other potentially toxic substances for which sufficient toxicity data are not available may not be released to waters of the state until safe levels are demonstrated through adequate bioassay studies.

Montana²⁶

All

Not specified

Water Supply
Class A - closed

Toxic substances narrative: No increases of toxic or other deleterious substances, pesticides and organic and inorganic materials including heavy metals, above naturally occurring concentrations, are allowed.

Water Supply (Classes
A-1, B-1, B-2, B-3)

Toxic substances narrative:
Concentrations of toxic or other deleterious substances which would remain in the water after conventional water treatment must not exceed the maximum contaminant levels set forth in the 1975 National Interim Primary Drinking Water Standards (40 CFR Part 141). The maximum allowable concentrations of toxic or deleterious substances also must not exceed acute or chronic problem levels as revealed by

State and Water UseCriteria Values

bioassay or other methods. The values listed in EPA Water Quality Criteria documents (Federal Register Vol. 45, No. 231, Friday, November 28, 1980, pages 79318-79379) shall be used as a guide to determine problem levels unless local conditions make these values inappropriate. In accordance with section 75-5-306(1), MCA, it is not necessary that wastes be treated to a purer condition than the natural condition of the receiving water. The board hereby adopts and incorporates by reference "EPA Water Quality Criteria documents (Federal Register Vol. 45, No. 231, Friday, November 28, 1980, pages 79318-79379)", which set forth water quality criteria for toxic or other deleterious substances. Copies of this document may be obtained from the Water Quality Bureau, Department of Health and Environmental Sciences, Cogswell Building, Capitol Station, Helena, Montana, 56920.

Class C-3

Same as above

Classes C-1 and C-2

Toxic substances narrative:
Concentrations of toxic or other deleterious substances must not exceed levels which render the waters harmful, detrimental or injurious to public health.

Class E

Toxic substances narrative: Concentrations of toxic or deleterious substances, pathogens, pesticides and organic and inorganic materials including heavy metals, must be less than those demonstrated to be deleterious to livestock or plants or to humans who may consume such livestock or plants or to adversely affect other indicated uses.

All Classes (except A-Closed and E)

The maximum allowable concentrations of toxic or deleterious substances also must not exceed acute or chronic problem levels as revealed by bioassay or other methods. The values listed in EPA Water Quality Criteria documents (Federal Register Vol. 45, No. 231, Friday, November 28, 1980, pages 79318 - 79379) shall be used as a guide to determine problem levels unless local conditions make these values inappropriate. In accordance with section 75-5-306(1), MCA, it is not necessary that wastes be treated to a purer condition than the natural condition of the receiving water.

Nebraska²⁷

All

Endrin	0.0002	(Maximum in mg/L)
Lindane	0.004	
Methoxychlor	0.1	
Toxaphene	0.005	
2,4-D	0.1	

State and Water UseCriteria Values

2,4,5-TP Silvex 0.01

Aquatic Life

Toxic substances narrative: Surface waters of the State shall be free from toxic substances in toxic amounts. No toxic substances alone or in combination with other substances in concentrations rendering the receiving water unsafe or unsuitable for aquatic life will be allowed. (In implementing these criteria, the Department will follow procedures outlines in the State's Continuing Planning Process which comply with the federal water quality standards, 40 C.F.R. §131.11 (1986)).

Public Drinking Water

Toxic substances narrative: Wastes or toxic substances introduced directly or indirectly by human activity in concentrations that would degrade the use (i.e., would produce undesirable physiological effects in humans) shall not be allowed.

Agricultural

Toxic substances narrative: Wastes or toxic substances introduced directly or indirectly by human activity in concentrations that would degrade the use (i.e., would produce undesirable physiological effects in crops or livestock) shall not be allowed.

Aesthetics and Public Health

Surface waters shall be free of radionuclides or toxic substances in concentrations or combinations which may produce undesirable physiological responses in humans.

Nevada²⁸

All

Aldrin	0.000003	(Maximum in mg/L)
Chlordane	0.00001	
DDT	0.000001	
Demeton	0.0001	
Dieldrin	0.000003	
Endosulfan	0.000003	
Endrin	0.000004	
Guthion	0.00001	
Heptachlor	0.000001	
Lindane	0.00001	
Malathion	0.0001	
Methoxychlor	0.00003	
Mirex	0.000001	
Parathion	0.000004	
2,4-D	0.1	
Silvex	0.01	
Toxaphene	0.000005	

All

Toxic substances narrative: Waters must be free from toxic substances attributable to domestic or

State and Water Use

Criteria Values

industrial waste or other controllable sources at levels or combinations sufficient to be toxic to human, animal, plant or aquatic life or in amounts sufficient to interfere with any beneficial use of the water.

The presence of toxic materials in a water must be evaluated by use of a 96-hour bioassay. Survival of test organisms must not be less than that in control tests which utilize appropriate control water. The test organisms and control water must be specified by the department. In addition, acute bioassays may be required to determine effluent limitations and the exact test method to be used must be defined by the department. Failure to determine presence of toxic materials by these methods shall not preclude determination of excessive levels of toxic materials on the basis of other criteria or methods. Wastes from municipal, industrial or other controllable sources containing arsenic, barium, boron, cadmium, chromium, cyanide, fluoride, lead, selenium, silver, copper and zinc that are reasonably amenable to treatment or control must not be discharged untreated or uncontrolled into the waters of Nevada (including the Colorado River System). In addition, the limits for concentrations of the chemical constituents must provide water quality consistent with the mandatory requirements of the 1962 Public Health Service Drinking Water Standards.

Drinking Water Supply
(with treatment by
disinfection only)
Suitable For Aquatic
Life Habitat, Wildlife
Propagation, Agricultural,
Recreation,
Boating, Esthetics
(Class A)

None (zero)

Drinking Water Supply
(with treatment by
disinfection and filtration only), Agricultural, Aquatic
Life and Wildlife
Propagation, Recreation,
Industrial and
Esthetics (Class B)

Toxic substances narrative: Only such amounts as will not render receiving waters injurious to fish or wildlife or impair the receiving waters for any beneficial uses established for this class.

Drinking Water Supply
(following complete
treatment) Agricultural,
Aquatic Life,

Same as above

State and Water Use

Criteria Values

Wildlife Propagation,
Recreation, Esthetics
and Industrial (Class C)

Boating and Esthetics,
Aquatic Life, Wildlife
Propagation, Agricultural and Industrial
(except for Food
Processing Purposes)
(Class D)

Toxic substances narrative: Only such amounts as will not impair receiving waters for any beneficial use established for this class.

New Hampshire²⁹

All

Not specified

Water Supply
(Class A)

Toxic substances narrative: No potentially toxic substances unless naturally occurring.

All Other Uses
(Classes B and C)

Toxic substances narrative: No potentially toxic substances in toxic concentrations or combinations.

Fish Life

Toxic substances narrative: All surface waters of the state shall be free from chemicals and other materials and conditions inimical to fish life or to maintenance of fish life.

All

Substances potentially toxic are evaluated in accordance with EPA's published water quality criteria for 64 toxic substances dated November 1980. Toxic limits are to be set utilizing bioassay procedures as outlined in CFR Vol. 45, No. 231, November 28, 1980.

When establishing limits on toxic substances for the protection of aquatic life, "Appendix B - Guidelines for Deriving Water Quality Criteria for the Protection of Aquatic Life and Its Uses," CFR Vol. 45, No. 231, November 28, 1980, will be utilized. Bioassay procedures and analysis shall be consistent with 'Methods for Measuring Acute Toxicity of Effluents (third edition)' published by EPA, or equivalent protocol as approved by the Commission.

Bioassay procedures and application factors used in establishing limits on toxic substances shall, as a minimum, be no less rigorous than the recommendations for bioassays and application factors contained in the National Technical Advisory Committee's report to the Secretary of the Interior on WATER QUALITY CRITERIA, April 1, 1968 or latest revision thereof.

State and Water UseCriteria ValuesNew Jersey³⁰

All

Aldrin/Dieldrin	0.0019	(maximum ug/L)
DDT and Metabolites	0.0010	
Endrin	0.0023	

Toxic substances narrative: Toxic substances in waters of the State shall not be at levels that are toxic to humans or the aquatic biota, or that bioaccumulate in the aquatic biota so as to render them unfit for human consumption.

FW-1 Waters

Surface water quality criteria shall be maintained as to quality in their natural state.

PL Waters

Surface water quality criteria shall be maintained as to quality in their existing state or that quality necessary to attain or protect the designated uses, whichever is more stringent.

FW-2 Waters

Chlordane	0.0043	(maximum ug/L)
Endosulfan	0.056	
Heptachlor	0.0038	
Lindane	0.080	
Toxaphene	0.013	

None which would cause standards for drinking water to be exceeded after appropriate treatment.

SE and SC Waters

Chlordane	0.0040	(maximum ug/L)
Endosulfan	0.0087	
Heptachlor	0.0036	
Lindane	0.004	
Toxaphene	0.005	

Toxic substances narrative: None, either alone or in combination with other substances, in such concentrations as to affect humans or be detrimental to the natural aquatic biota, produce undesirable aquatic life, or which would render the waters unsuitable for the designated uses.

Toxic substances shall not be present in concentrations that cause acute or chronic toxicity to aquatic biota, or bioaccumulate within an organism to concentrations that exert a toxic effect on that organism or render it unfit for consumption.

The concentrations of nonpersistent toxic substances in the State's waters shall not exceed one-twentieth (0.05) of the acute definitive LC50 or EC50 value, as determined by appropriate bioassays conducted in accordance with N.J.A.C. 7:18.

State and Water UseCriteria Values

The concentrations of persistent toxic substances in the State's waters shall not exceed one-hundredth (0.01) of the acute definitive LC50 or EC50 value, as determined by appropriate bioassays conducted in accordance with N.J.A.C. 7:18.

Zones 1C-6

General criteria narrative: The waters shall not contain substances attributable to municipal, industrial, or other discharges in concentrations or amounts sufficient to preclude the specified water uses to be protected. Within this requirement the waters shall be substantially free from substances in concentrations or combinations which are toxic or harmful to human, animal, plant, or aquatic life, or that produce color, taste, or odor in the water, or that taint fish or shellfish flesh.

In no case shall concentrations of substances exceed those values given for rejection of water supplies in the United States Public Health Service Drinking Water Standards.

New Mexico³¹

All

Not specified

All

Toxic substances narrative: Toxic substances such as, but not limited to, pesticides, herbicides, heavy metals, and organics, shall not be present in receiving waters in concentrations which will change the ecological conditions of receiving waters to an extent detrimental to man or other organisms of direct or indirect commercial, recreation, or aesthetic value. Toxicities of substances in receiving waters will be determined by appropriate bioassay techniques, or other acceptable means, for the particular form of aquatic life which is to be preserved with the concentrations of toxic substances not to exceed 5% of the LC-50 provided that: toxic substances which, through uptake in the aquatic food chain and/or storage in plant and animal tissues, can be magnified to levels which are toxic to man or other organisms, shall not be present in concentrations which result in this biological magnification or exceed 1% of the LC-50. Waters designated for use as domestic water supplies shall not contain substances in concentrations that exceed drinking water standards set forth in Section 202.B of the New Mexico Regulations Governing Water Supplies.

State and Water UseCriteria ValuesNew York³²Classes AA, AA-s,
A, A-s (Human)

Aldicarb	7
2,4-D	100
DDT, DDD, DDE	0.01
Endrin	0.2
Heptachlor and Heptachlor Epoxide	0.009
Methoxychlor	35
Silvex (2,4,5-TP)	10

(maximum ug/L)

Classes AA, AA-s,
A, A-s (Aquatic)

Aldrin+Dieldrin	0.001
DDT, DDD, DDE	0.001
Demeton	0.1
Endosulfan	0.009
Endrin	0.002
Heptachlor and Heptachlor Epoxide	0.001
Malathion	0.1
Methoxychlor	0.03
Mirex	0.001
Parathion and Methyl Parathion	0.008
Toxaphene	0.005

Classes B, C

Aldrin+Dieldrin	0.001
DDT, DDD, DDE	0.001
Demeton	0.1
Endosulfan	0.009
Endrin	0.002
Heptachlor and Heptachlor Epoxide	0.001
Malathion	0.1
Methoxychlor	0.03
Mirex	0.001
Toxaphene	0.005

Class D

Aldrin+Dieldrin	0.001
DDT, DDD, DDE	0.001
Endosulfan	0.22
Endrin	0.002
Heptachlor and Heptachlor Epoxide	0.001
Mirex	0.001
Toxaphene	1.6

Classes SA, SB, SC

Aldrin+Dieldrin	0.001
DDT, DDD, DDE	0.001
Demeton	0.1
Endosulfan	0.001
Endrin	0.002
Heptachlor and Heptachlor Epoxide	0.001
Malathion	0.1

State and Water Use**Criteria Values**

Methoxychlor	0.03
Mirex	0.001
Toxaphene	0.005

Class SD

Aldrin+Dieldrin	0.001
DDT, DDD, DDE	0.001
Endosulfan	0.034
Endrin	0.002
Heptachlor and Heptachlor Epoxide	0.001

Fresh Surface Waters

Toxic substances narrative: None in amounts that will be injurious to fishlife or which in any manner shall adversely affect the flavor, color or odor thereof, or impair the waters for any best usage as determined for the specific waters which are assigned to each class.

Classes SA, SB, SC

Toxic substances narrative: None in amounts that will interfere with use for primary contact recreation or that will be injurious to edible fish or shellfish or the culture or propagation thereof, or which in any manner shall adversely affect the flavor, color, odor or sanitary condition thereof or impair the waters for any best usage as determined for the specific waters which are assigned to each class.

Class SD

Toxic substances narrative: None alone or in combination with other substances or wastes in sufficient amounts to prevent survival of fish life or impair the waters for any other best usage as determined for the specific waters which are assigned to this class.

Class A

Toxic substances narrative: None in amounts that will interfere with use for primary contact recreation or that will be injurious to the growth and propagation of fish, or which in any manner shall adversely affect the flavor, color, or odor thereof or impair the waters for any other best usage as determined for the specific waters which are assigned to this class.

Class I

Toxic substances narrative: None in amounts that will interfere with use for secondary contact recreation or that will be injurious to edible fish or shellfish or the culture or propagation thereof, or which in any manner shall adversely affect the flavor, color, odor or sanitary condition thereof or impair the waters for any best usage as determined for the specific waters which are assigned to this class.

Class II

Toxic substances narrative: None alone or in combination with other substances or wastes in sufficient amounts to be injurious to edible fish and shellfish, or the culture or propagation thereof, or

State and Water UseCriteria Values

which shall in any manner affect the flavor, color, odor or sanitary condition of such fish or shellfish so as to injuriously affect the sale thereof, or which shall cause any injury to the public and private shellfisheries of this State.

North Carolina³³

Fresh Surface Waters

Aldrin	0.002	(maximum ug/L)
Chlordane	0.004	
DDT	0.001	
Demeton	0.1	
Dieldrin	0.002	
Endosulfan	0.05	
Endrin	0.002	
Guthion	0.01	
Heptachlor	0.004	
Lindane	0.01	
Methoxychlor	0.03	
Mirex	0.001	
Parathion	0.04	
Toxaphene	0.013	

Classes WS-1, WS-2,
WS-3

2,4-D	100	(maximum ug/L)
2,4,5-TP (Silvex)	10	

Toxic substances narrative [Rule .0211(b)(3)(L)]: Only such amounts, whether alone or in combination with other substances or wastes as will not render the waters injurious to public health, secondary recreation, or to aquatic life and wildlife (either through chronic or acute exposure or through bioaccumulation), or impair the waters for any designated uses; any toxic substance or complex waste will be considered acutely toxic at instream waste concentrations greater than one third of the 96-hour LC50 value; acceptable levels of chronic exposure may be determined by test procedures deemed appropriate by the director.

Action Levels for toxic substances [Rule .0211(b)(4)]: If the levels of any of the substances listed in this Paragraph (which are generally not bioaccumulative and have variable toxicity to aquatic life because of chemical form, solubility, stream characteristics and/or associated waste characteristics) are determined by the waste load allocation to be exceeded in a receiving water by a discharge under the specified low flow criterion for toxic substances (Rule .0206), the discharger will be required to monitor the chemical and/or biological effects of the discharge as part of the NPDES permit; efforts shall

State and Water UseCriteria Values

be made by all dischargers to reduce or eliminate these substances from their effluents; after receiving such monitoring data for discharge, the substance will be limited to the level listed in this Paragraph or an appropriate toxicity limit will be set as determined using the requirements of Rule .0208(a).

Tidal Salt Waters

Aldrin	0.003	(maximum ug/L)
Chlordane	0.004	
DDT	0.001	
Demeton	0.1	
Dieldrin	0.002	
Endosulfan	0.009	
Endrin	0.002	
Guthion	0.01	
Heptachlor	0.004	
Lindane	0.004	
Methoxychlor	0.03	
Mirex	0.001	
Parathion	0.04	
Toxaphene	0.07	

Toxic substances narrative [Rule .0212(b)(3)(L)]: Only such amounts, whether alone or in combination with other substances or wastes as will not render the waters injurious to aquatic life and wildlife, or impair the waters for any designated uses.

Action Levels for toxic substances [Rule .0212(b)(4)]: Same as for Fresh Surface Waters.

All

Toxic substance narrative[Rule .0208(a)]: The concentration of toxic substances in the receiving water, (either alone or in combination, when affirmatively demonstrated to be non-bioaccumulative) when not specified elsewhere in this Section, shall not exceed the concentration specified by the fraction of the 96-hour LC50 value which predicts a no effect chronic level (as determined by the use of established acute/chronic ratios). If an acceptable acute/chronic ratio is not available, then that toxic substance shall not exceed one-one hundredth (0.01) of the 96-hour LC50 or if it is affirmatively demonstrated that a toxic substance has a half-life of less than 96 hours or is not bioaccumulative, the maximum concentration shall not exceed one-twentieth (0.05) of the 96-hour LC50. If it is affirmatively demonstrated that the standard for a particular toxic substance as specified in Rule .0211 or .0212 of this Section is inappropriate for a specific stream segment, the commission may revise the applicable standard on a

State and Water UseCriteria Values

case-by-case basis in accordance with the provisions of Section 143-214.1 of the General Statutes of North Carolina.

North Dakota³⁴

All

Toxic substances narrative: Free from substances attributable to municipal, industrial, or other discharges or agricultural practices in concentrations or combinations which are toxic or harmful to human, animal, plant or resident aquatic biota.

Mixing zones narrative: The 96-hour LC 50 for indigenous or resident fish and fish food organisms shall not be exceeded at any point in the mixing zone.

Sampling and testing narrative: Bioassay tests shall be performed in accordance with procedures outlined in the latest edition of "Standard Methods for the Examination of Water and Wastewater", published by the American public health association, or in accordance with tests or analytical procedures that have been found to be equal or more applicable by the department or the environmental protection agency. Bioassay studies shall be made using a sensitive resident species.

Ohio³⁵Public Water Supply
Lake Erie

Aldrin ^b	0.000074 ^c	(maximum µg/L)
Chlordane	0.00046 ^c	
2,4-D	100.0	
2,4,5-TP ^b	10.0	
DDT ^b	0.000024 ^c	
Dieldrin ^b	0.000071 ^c	
Endosulfan	74	
Endrin	1.0	
Heptachlor ^b	0.00028 ^c	
Heptachlor Epoxide	0.1	
Lindane	0.019 ^c	
Methoxychlor	100.0	
Toxaphene	0.00071 ^c	

Aquatic Life Habitat
Lake Erie

Concentrations for Aquatic Life Habitat are 30-day average criteria. All concentrations are expressed in µg/L.

Aldrin ^b	0.01
Benzene Hexachloride	0.1
Chlordane	0.01
DDT ^b	0.001
Demeton	0.1

State and Water UseCriteria Values

Dieldrin	0.005
Endosulfan	0.003
Endrin	0.002
Guthion	0.005
Heptachlor ^b	0.001
Lindane	0.01
Malathion	0.1
Methoxychlor	0.005
Mirex	0.001
Parathion	0.008
Toxaphene	0.005

^a Pesticides are not to exceed the concentrations in this table, or the Safe Drinking Water Act, whichever is more stringent.

^b Use has been banned.

^c For protection of human health from the potential carcinogenic effects, at a 10^{-6} incremental increase of cancer risk over the lifetime, due to exposure through ingestion of contaminated water and contaminated aquatic organisms.

All

General narrative: Free from substances entering the waters as a result of human activities in concentrations that are toxic or harmful to human, animal or aquatic life and/or are rapidly lethal in the mixing zone.

All

Antidegradation policy: Present ambient water quality in state resource waters will not be degraded for all substances determined to be toxic or to interfere with any designated use as determined by the director of Ohio environmental protection agency.

Lake Erie

Toxic substances narrative: All pollutants or combinations of pollutants not specifically mentioned in this rule, shall not exceed water quality criteria derived according to the procedures set forth in "Draft Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Life and Its Uses," United States environmental protection agency, July 5, 1983, or, if insufficient data prevent the use of this procedure, shall not exceed, at any time, one-tenth, or, for pollutants or combinations of pollutants which are known to be persistent toxicants in the aquatic environment, one one-hundredth of the ninety-six-hour median tolerance limit (TL_m) or LC₅₀ for any representative aquatic species. However, more stringent application factors shall be imposed where justified by "Ambient Water Quality Criteria," documents, United States environmental protection agency, 1980; "Quality

State and Water UseCriteria Values

Criteria for Water," U.S. environmental protection agency, 1976; "Water Quality Criteria 1972," "National Academy of Sciences" and "National Academy of Engineering," 1973; or other scientifically based publications.

The median tolerance limit (TLM) or LC₅₀ shall be determined by static or dynamic bioassays performed in accordance with methods outlined in "Standard Methods for the Examination of Water and Wastewater," fifteenth edition, "American Public Health Association," "American Water Works Association" and the "Water Pollution Control Federation, 1981"; or performed in accordance with procedures outlined in "Methods of Acute Toxicity Tests with Fish, Macroinvertebrates and Amphibians," United States environmental protection agency 660/3-75-009. Tests will be conducted using actual effluent, receiving water and representative aquatic species whenever possible.

Ohio River

Free from substances in concentrations which are toxic or harmful to humans, animals, or fish and other aquatic life which would in any manner adversely affect the flavor, color, odor, or edibility of fish and other aquatic life, wildlife or livestock or which are otherwise detrimental to the designated uses.

Toxic substances narrative:

(a) Non-cumulative substances - not to exceed one-tenth (0.1) the ninety-six-hour LC₅₀ of representative important species indigenous to the Ohio river.

(b) Cumulative substances - not to exceed one one-hundredth (0.01) of the ninety-six-hour LC₅₀ of representative important species indigenous to the Ohio river.

(c) Other limiting concentrations may be used when justified on the basis of available evidence and approved by the appropriate regulatory agency or agencies.

Oklahoma³⁶Public And Private
Water Supplies

2,4-D	0.100	(maximum mg/L)
2,4,5-TP	0.010	
Endrin	0.0002	
Lindane	0.004	
Methoxychlor	0.100	
Toxaphene	0.005	

State and Water UseCriteria Values

Pesticides Narrative: Pesticides shall not be present in such concentrations as to cause the waters of the State which are designated as public and private water supplies to be toxic, carcinogenic, mutagenic, or teratogenic to humans.

Fish And Wildlife

Pesticides Narrative: Pesticides shall not be present in such concentrations as to cause the waters of the State designated for fish and wildlife propagation to be toxic, carcinogenic or mutagenic to animal, plant or aquatic life. The instream concentrations of pesticides shall not exceed the following numerical criteria:

Aldrin/Dieldrin	1.00	(maximum ug/L)
Chlordane	0.02	
DDT	0.20	
Endosulfan	0.20	
Endrin	0.20	
Heptachlor	0.50	
Lindane	2.00	
Toxaphene	1.00	
2,4,5-TP Silvex	10.00	

Although pesticides can occur in low concentrations in the water column, they may accumulate in bottom sediments and tissues of aquatic organisms. Therefore, sediment and tissue analyses should routinely be used to complement water analyses. Pesticide concentrations in whole fish tissue in excess of the following alert levels shall be cause for concern and further investigation:

Aldrin/Dieldrin	0.3 (maximum mg/kg)
Chlordane	0.3
DDT	5.0
Endrin	0.3
Heptachlor	0.3
Toxaphene	5.0

**Primary Contact
Recreation**

The water shall not contain chemical, physical or biological substances in concentrations that are irritating to skin or sense organs or are toxic or cause illness upon ingestion by human beings.

**Secondary Contact
Recreation**

Waters shall be maintained to be free from human pathogens in numbers which may produce adverse health effects in humans.

All

Mixing zones narrative: The concentration of toxic substances in a mixing zone shall not exceed the 96-hour LC₅₀ for sensitive indigenous species.

State and Water Use

Criteria Values

Oregon³⁷

All

Pesticides and other Organic Toxic Substances shall not exceed those criteria contained in the 1976 edition of the EPA publication "Quality Criteria for Water". These criteria shall apply unless supporting data show conclusively that beneficial uses will not be adversely affected by exceeding a criterion by a specific amount or that a more stringent criterion is warranted to protect beneficial uses.

Pennsylvania³⁸

All

Water shall not contain substances attributable to point or nonpoint source discharges in concentration or amounts sufficient to be inimical or harmful to the water uses to be protected or to human, animal, plant, or aquatic life.

(The list of specific water quality criteria does not include all possible substances that could cause pollution. For substances not listed, the general criterion that these substances shall not be inimical or injurious to the designated water uses applies. The best scientific information available will be used to judge the suitability of a given waste discharge where these substances are involved.)

Protection Of Aquatic
Life

(a) When a specific water quality criterion has not been established for a pollutant and a discharge of a pollutant into waters of the Commonwealth designated to be protected for aquatic life is proposed, a specific water quality criterion for such pollutant may be determined by the Department through establishment of a safe concentration value.

(b) Establishment of a safe concentration value shall be based upon data obtained from relevant aquatic field studies, standard continuous flow bioassay test data which exists in substantial available literature, or data obtained from specific tests utilizing one or more representative important species of aquatic life designated on a case-by-case basis by the Department and conducted in a water environment which is equal to or closely approximates that of the natural quality of the receiving waters.

(c) In those cases where it has been determined that there is insufficient available data to establish a safe concentration value for a pollutant, the safe concentration value shall be determined by applying the appropriate application factor to the 96-hour (or greater) LC50 value. Except where the Department determines, based upon substantial available data,

State and Water Use

Criteria Values

that an experimentally derived application factor exists for a pollutant, the following application factors shall be used in the determination of safe concentration values:

(1) Concentrations of pollutants that are noncumulative shall not exceed 0.05 (1/20) of the 96-hour LC50.

(2) Concentrations of pollutants that are cumulative shall not exceed 0.01 (1/100) of the 96-hour LC50.

(3) Concentrations of pollutants with known synergistic or antagonistic effects with pollutants in the effluent or receiving water will be established on a case-by-case basis using the best available scientific data.

Rhode Island³⁹

All

EPA has published water quality criteria for the protection of aquatic life for 21 of the 126 priority pollutants (45 FR 79318 November 28, 1980). These pollutants are priority metals and pesticides, and PCBs and cyanide. The EPA Water Quality Criteria consist of both an acute concentration and a chronic concentration for each pollutant. The acute concentration should not be exceeded by the average concentration of the pollutant over any 30 day period. The methodology by which these EPA criteria were derived is given in the Federal Register announcement.

On 7 February 1984, EPA published in the Federal Register proposed revisions to several of the 1980 water quality criteria (49 FR 4551). With the exception of chromium III for which no 1980 criteria were available, the 1984 fresh water criteria will only be adopted by the State after they have been promulgated by EPA.

	Acute	Chronic	
Aldrin	3.0		(maximum ug/L)
Dieldrin	2.5	0.0019	
Chlordane	2.4	0.0043	
DDT	1.1	0.001	
Endosulfan	0.22	0.056	
Endrin	0.18	0.0023	
Heptachlor	0.52	0.0038	
Lindane	2.0	0.080	
Toxaphene	1.6	0.013	

State and Water Use

All Freshwater

Criteria Values

RIDEM has derived freshwater guidelines for many pollutants for which EPA Water Quality Criteria are not available. In order for a guideline to be derived, the toxicity database for the pollutant must meet minimum requirements.

The database must contain at least two acute toxicity test results expressed as either an EC_{50} or an LC_{50} as specified in the EPA Water Quality Criteria Guidelines (45 FR 79343, 1980). " LC_{50} " is defined as the concentration of a test material in a suitable diluent at which 50 percent of the exposed organisms die during a specified time period. " EC_{50} " is defined as the concentration of a test material in a suitable diluent at which 50 percent of the exposed organisms exhibit a specified response during a specified time period.

The two acute toxicity test results shall consist of:

1. One daphnid (D.magna or D. pulex)
2. One fish either:
 - (a) fathead minnow (Pimephales promelas)
 - (b) bluegill (Lepomis macrochirus)
 - (c) rainbow trout (Salmo gairdneri)

For every pollutant which meets these minimum data requirements, acute and chronic guidelines are derived using the following equations:

$\text{Lowest } LC_{50} \text{ or } EC_{50} \times .05 = \text{Acute guideline}$

$\text{Acute guideline} / 45 = \text{Chronic guideline}$

The uncertainty factor, .05, is intended to provide an adequate margin of safety to protect most aquatic organisms from acutely toxic effects. The uncertainty factor was selected by calculating uncertainty factor guidelines for those pollutants with EPA Water Quality Criteria. These guidelines were most similar to the EPA Water Quality Criteria when an uncertainty factor of .05 was used.

The acute guideline is divided by an acute to chronic ratio of 45 to yield the chronic guideline. This ratio was derived by the State of Michigan using all available acute to chronic values for priority pollutant tests performed on fresh water species. It was determined that 80% of the pollutants would have a geometric mean acute to chronic ratio of 45 or less.

State and Water UseCriteria Values

The methodology by which these criteria are derived is similar to that used in the EPA Red Book (1976) which preceded the 1980 Water Quality Criteria.

Class A

The limits prescribed by the United States Environmental Protection Agency will be used where not superseded by more stringent State requirements.

Classes B and C

The ambient concentration of a pollutant in a water body designated as suitable for fish and/or wildlife habitat shall not exceed the R.I. DEM Ambient Water Quality Guidelines for the protection of aquatic organisms from chronic effects, unless the chronic guideline is modified by the Director based on results of bioassay tests conducted in accordance with the terms and conditions provided in Appendix C.

Class D

The ambient concentration of a pollutant in a water body designated as suitable for fish migration shall not exceed the R.I. DEM Ambient Water Quality Guidelines for the protection of aquatic organisms from acute effects, unless the acute guideline is modified by the Director based on results of bioassay tests conducted in accordance with the terms and conditions provided in Appendix C.

Classes A, B, C, D

Waters shall be free from chemical constituents in concentrations or combinations which could be harmful to human, animal, or aquatic life for the appropriate most sensitive and governing water class use or unfavorably alter the biota.

All Saltwater

EPA 1980 Ambient Water Quality Criteria for estuarine and marine waters shall be adopted as State water quality guidelines for those pollutants for which they were derived. These guidelines are given in Table III. At this time, no minimum data base guidelines for priority pollutants in marine waters have been derived.

	Acute	Chronic	
Aldrin	1.3		(maximum ug/L)
Dieldrin	0.71	0.0019	
Chlordane	0.09	0.0040	
DDT	0.13	0.010	
Endosulfan	0.034	0.0087	
Endrin	0.037	0.0023	
Heptachlor	0.053	0.0036	
Lindane	0.16		
Toxaphene	0.07		

Class SA

None in concentrations or combinations which would be harmful to human, animal or aquatic life or which

State and Water Use

Criteria Values

would make the waters unsafe or unsuitable for fish or shellfish or their propagation, impair the palatability of same, or impair the waters for any other uses.

Class SB

None in concentrations or combinations which would be harmful to human, animal or aquatic life or which would make the waters unsafe or unsuitable for fish or shellfish or their propagation, or impair the water for any other usage assigned to this Class.

Class SC

None in concentrations or combinations which would be harmful to human, animal or aquatic life or which would make the waters unsafe or unsuitable for fish or shellfish or their propagation, or impair the water for any other usage assigned to this Class. The ambient concentration of a pollutant in a water body designated as suitable for fish and/or wildlife habitat shall not exceed the R.I. DEM Ambient Water Quality Guidelines for the protection of aquatic organisms from chronic effects, unless the chronic guideline is modified by the Director based on results of bioassay tests conducted in accordance with the terms and conditions provided in Appendix C.

Classes A, B, C, D,
SA, SB, SC

If an aquatic toxicity value has not been established established in the R.I. DEM Ambient Water Quality Guidelines, then the level of any "priority pollutant" shall not exceed the "detection limits" in the ambient water unless the discharger demonstrates to the satisfaction of the Director that a higher concentration will not adversely effect the most sensitive use of the water body.

South Carolina⁴⁰

All

Not specified

All

Toxic substances narrative: All ground waters and surface waters of the State shall at all times, regardless of flow, be free from toxic substances attributable to sewage, industrial waste, or other waste in concentrations or combinations which interfere with classified water uses, existing water uses or which are harmful to human, animal, plant or aquatic life.

Classes AA and SAA

Toxic substances narrative: Natural conditions will be maintained and protected as feasible, within the Department's statutory authority.

Classes A-Trout and
B-Trout

Toxic substances narrative: None alone or in combination with other substances or wastes in

State and Water Use

Criteria Values

sufficient amounts to be injurious to reproducing trout populations or in any manner adversely affect the taste, color, odor, or sanitary condition thereof or impair the waters for any other best usage as determined for the specific waters which are assigned to this class.

Classes A and SB

Toxic substances narrative: None alone or in combination with other substances or wastes in sufficient amounts to make the waters unsafe or unsuitable for primary contact recreation or to impair the waters for any other best usage as determined for the specific waters which are assigned to this class.

Classes B and SC

Toxic substances narrative: None alone or in combination with other substances or wastes in sufficient amounts to be harmful to the survival of freshwater(B) and marine(SC) fauna and flora or the culture or propagation thereof; to adversely affect the taste, color, odor, or sanitary condition of fish for human consumption; to make the (B) waters unsafe or unsuitable for secondary contact recreation; or to impair the waters for any other best usage as determined for the specific waters which are assigned to this class.

Class SA

Toxic substances narrative: None alone or in combination with other substances or wastes in sufficient amounts to adversely affect the taste, color, odor, or sanitary condition of clams, mussels, or oysters for human consumption; or impair the waters for any other best usage as determined for the specific waters which are assigned to this class.

South Dakota⁴¹

All

Not specified

Toxic substances narrative: Substances which produce concentrations of any substance toxic to humans, animals, plants, or aquatic life may not be discharged or caused to be discharged into any lake or stream. Toxicity of nonbioaccumulative pollutants to aquatic life shall be determined in accordance with §74:03:02:06. Toxicity of bioaccumulative pollutants shall be determined using bioassay methods in accordance with §74:03:02:06 and additional data on the rates and effects of bioaccumulation so that the aquatic community and those organisms including man which use those aquatic organisms for food are protected against potential adverse health effects. Toxic concentrations shall be specified in terms of 24-hour and 30-day average concentrations or maximum

State and Water UseCriteria Values

concentrations allowed or both. Where numerical criterion has been established for a toxic substance in §§74:03:02:33 to 74:03:02:45, inclusive, the provisions of this section do not apply to that substance.

Tennessee⁴²

All

Not specified

Domestic Water Supply

Toxic substances narrative: The waters shall not contain toxic substances, whether alone or in combination with other substances, which will produce toxic conditions that materially affect the health and safety of man or animals, or impair the safety of conventionally treated water supplies. Available references to be used in determining such conditions shall include, but not be limited to: Quality Criteria for Water (Section 304(a) of PL 92-500); Federal Regulations under Section 307 of PL 92-500; and Federal Regulations under Section 1412 of the Public Health Service Act as amended by the Safe Drinking Water Act (PL 93-523).

Industrial Water Supply

Toxic substances narrative: The waters shall not contain toxic substances whether alone or in combination with other substances, which will adversely affect industrial processing.

Fish And Aquatic Life

Toxic Substances Narrative: The waters shall not contain substances or combination of substances including disease causing agents which, by way of either direct exposure or indirect exposure through food chains may cause death, disease, behavioral abnormalities, cancer, genetic mutations, physiological malfunctions (including malfunctions in reproduction), physical deformations, or restrict or impair growth in fish or aquatic life or their offspring. In no event shall the diversity or productivity of biota significant to the aquatic community of the receiving stream be decreased. References to be used in determining toxicity limitations shall include but not be limited to: Quality Criteria for Water (Section 304(a) of Public Law 92-500), Federal Regulations under Section 307 of Public Law 92-500, and Federal Regulations under Section 1412 of the Public Health Service Act as amended by the Safe Drinking Water Act (Public Law 93-523). The use of such information should be limited to that part applicable to the aquatic community found within the receiving stream or waters under consideration.

State and Water UseCriteria Values

Recreation

Toxic substances narrative: The water shall not contain toxic substances whether alone or in combination with other substances, that will render the waters unsafe or unsuitable for water contact activities, or will propose toxic conditions that will adversely affect man or animal.

Irrigation

Toxic substances narrative: The waters shall not contain toxic substances that will produce toxic conditions that will affect the water for irrigation.

Livestock Watering
and Wildlife

Toxic substances narrative: The waters shall not contain toxic substances whether alone or in combination with other substances, that will produce toxic conditions that will affect the water for livestock watering and wildlife.

Texas⁴³

All Fresh Water

	<u>Acute (ug/l)</u>	<u>Chronic (ug/l)</u>
Aldrin	3.0	-
Chlordane	2.4	0.0043
Chlorpyrifos	0.083	0.041
DDT	1.1	0.0010
Demeton	-	0.1
Dieldrin	2.5	0.0019
Guthion	-	0.01
Heptachlor	0.52	0.0038
Lindane	2.0	0.08
Malathion	-	0.01
Mehtoxychlor	-	0.01
Mirex	-	0.001
Parathion	0.065	0.013
Toxaphene	0.78	0.0002

All

(d) Toxic parameters. Surface waters will not be toxic to man, or to terrestrial or aquatic life. Additional standards requirements for toxic materials are specified in §307.6 of this title (relating to Toxic Materials).

§307.6. TOXIC MATERIALS.

(a) Application. Standards and procedures set forth in this section apply to all water in the state, except as indicated in §307.8 of this title (relating to Application of Standards) and §307.9 of this title (relating to Determination of Standards Attainment).

(b) General provisions.

(1) Water in the state shall not be acutely toxic to aquatic life except in small zones of initial dilution at discharge points, in accordance with §307.8

State and Water UseCriteria Values

(relating to Application of Standards).

(2) Water in the state with designated or existing aquatic life uses shall not be chronically toxic to aquatic life, except in mixing zones and below critical low-flow conditions, in accordance with §307.8 of this title (relating to Application of Standards).

(3) Water in the state shall be maintained to preclude adverse toxic effects on human health resulting from contact recreation, consumption of aquatic organisms, or consumption of drinking water after reasonable treatment. In addition to other provisions of this section, permitted discharges or other controllable sources shall not cause maximum contaminant levels for public drinking water supplies, as established in the federal Safe Drinking Water Act (42 United States Code 300f et seq.), to be exceeded after reasonable treatment by a water supply treatment plant. The commission will utilize available investigative and regulatory means to identify and control sources of toxic pollutants which cause or could potentially cause the following guidelines to be exceeded:

(A) EPA maximum contaminant levels for drinking water supplies; and

(B) U.S. Food and Drug Administration Action Levels for toxic concentrations in fish and shellfish tissue.

Utah⁴⁴

Domestic Source

Endrin	0.2	(Maximum µg/L)
Lindane	4.0	
Methoxychlor	100	
Toxaphene	5	
2,4-D	100	
2,4,5-TP	10	

Aquatic Wildlife
3A, 3B, 3C, and 3D

Aldrin	3.0	
Chlordane	.0043 4 day avg.	
	2.4 1 hour avg.	
Endosulfan	.056 4 day avg.	
	.18 1 hour avg.	
Guthion	.01	
Heptachlor	.0038 4 day avg.	
	.52 1 hour avg.	
Methoxychlor	.003	
Mirex	.001	
Parathion	.04	
PCBs	.014 4 day avg.	
	2.0 1 hour avg.	

State and Water Use Criteria Values

PCP	13 4 day avg.	pH dependent
	20 1 hour avg.	pH dependent
Endrin	.0023 4 day avg.	
	.18 1 hour avg.	
Lindane	.08 4 day avg.	
	2.0 1 hour avg.	
Methoxychlor	.03	
Toxaphene	.0002 4 day avg.	
	.73 1 hour avg.	

All

Toxic substances narrative: It shall be unlawful, and a violation of these regulations, for any person to discharge or place any waste or other substance in such a way as will be or may become offensive; or conditions which produce undesirable aquatic life or which produce objectionable tastes in edible aquatic organisms; or concentrations or combinations of substances which produce undesirable physiological responses in desirable resident fish, or other desirable aquatic life, as determined by bioassay or other tests performed in accordance with standard procedures determined by the Committee.

Vermont⁴⁵

All

Not specified

Toxic substances narrative: The waters of the state shall be managed so as to prevent the discharge of radioactive or toxic wastes in concentrations, quantities or combinations that may create a significant likelihood of an adverse impact on human health or acute or chronic toxicity to aquatic biota, fish or wildlife. Unless otherwise specified by these rules, the Secretary shall determine limits for discharges containing radioactive or toxic wastes based on the results of biological toxicity assessments and the appropriate available scientific data, including but not limited to:

1. The current edition of the EPA publications "Quality Criteria for Water" and the 1980 Ambient Water Quality Criteria Documents ("White Books")
2. The Vermont State Health Regulation, Part 5, Chapter 3 "Radiological Health", effective as of 12/10/77
3. 10 CFR 50, Appendix I

In establishing such limits the Secretary shall give consideration to the potential for bioaccumulation as well as any antagonistic or synergistic relationship

State and Water UseCriteria Values

that may exist between the wastes being discharged and the concentration of other wastes or constituents in the receiving waters. The discharge of radioactive wastes shall not exceed the lowest limits which are reasonably achievable.

Virginia⁴⁶Public Water Supply
(Surface)

Endrin	0.0002 (Maximum mg/L)
Lindane	0.004
Methoxychlor	0.1
Toxaphene	0.005

The numeric standards for these chemicals are designated to protect public water supplies for human consumption. The limits established for these chemicals may not protect aquatic life. Therefore when a request to classify a stream as a public water supply is received, it will be determined if more stringent limits are needed for those chemicals in order to insure protection of aquatic life.

2,4-D	0.1 (maximum mg/L)
2,4,5-TP	0.01

Surface Water
(Chronic Criteria For
The Protection Of
Aquatic Life)

Aldrin	0.03 - freshwater	(maximum µg/L)
	0.003 - saltwater	
Chlordane	0.0043 - freshwater	
	0.004 - saltwater	
DDT	0.001 - all waters	
Demeton	0.1 - all waters	
Dieldrin	0.0019 - all waters	
Endosulfan	0.056 - freshwater	
	0.0087 - saltwater	
Endrin	0.0023 - all waters	
Guthion	0.01 - all waters	
Heptachlor	0.0038 - freshwater	
	0.0036 - saltwater	
Lindane	0.080 - freshwater	
	0.0016 - saltwater	
Malathion	0.1 - all waters	
Methoxychlor	0.03 - all waters	
Mirex	0.00 - all waters	
Parathion	0.04 - all waters	
Toxaphene	0.013 - freshwater	
	0.0007 - saltwater	

All

All State waters shall be free from substances attributable to sewage, industrial waste, or other wastes in concentration, amounts, or combinations which contravene established standards or interfere directly or indirectly with reasonable, beneficial uses of such water or which are inimical or harmful to

State and Water UseCriteria Values

human, animal, plant or aquatic life. Specific substances to be controlled include, but are not limited to: floating debris, oil, scum, and other floating material; toxic substances; substances that settle to form sludge deposits, and substances which nourish undesirable or nuisance aquatic plant life. Effluents which tend to raise the temperature of the receiving water will also be controlled.

Washington⁴⁷

All

Not specified

Class AA

Toxic substances narrative: Toxic, radioactive, or deleterious material concentrations shall be less than those which adversely affect public health, the natural aquatic environment, or the desirability of the water for any use.

Class A, B, and C

Toxic substances narrative: Toxic, radioactive, or deleterious material concentrations shall be below those of public health significance, or which may cause acute or chronic toxic conditions to the aquatic biota, or which may adversely affect any water use.

All

Deleterious concentrations of toxic, or other nonradioactive materials, shall be determined by the department in consideration of the Quality Criteria for Water, published by USEPA 1976, and as revised, as the authoritative source for criteria and/or other relevant information, if justified.

West Virginia⁴⁸

All

Chlordane	.0043	(Maximum ug/L)
DDT	.001	
Aldrin/Dieldrin	.0019	
Endrin	.0023	
Toxaphene	.005	
Methoxychlor	.03	

All

No sewage, industrial wastes or other wastes present in any of the waters of the State shall cause or materially contribute to concentrations of materials harmful, hazardous or toxic to man, animal, or aquatic life.

State and Water Use

Criteria Values

Wisconsin⁴⁹

All

Not specified

All

Toxic substances narrative: Substances in concentrations or combinations which are toxic or harmful to humans shall not be present in amounts found to be of public health significance, nor shall substances be present in amounts which are acutely harmful to animal, plant or aquatic life.

Fish And Aquatic Life

Toxic substances narrative: Unauthorized concentrations of substances are not permitted that alone or in combination with other materials present are toxic to fish or other aquatic life. The determination of the toxicity of a substance shall be based upon the available scientific data base. References to be used in determining the toxicity of a substance shall include, but not be limited to:

1. "Quality Criteria for Water". EPA-440/9-76-003. United States Environmental Protection Agency, Washington, D.C., 1976, and

2. "Water Quality Criteria 1972". EPA-R3-73-033. National Academy of Sciences, National Academy of Engineering. United States Government Printing Office, Washington, D.C., 1974.

3. Questions concerning the permissible levels, or changes in the same, of a substance, or combination of substances, of undefined toxicity to fish and other biota shall be resolved in accordance with the methods specified in "Water Quality Criteria 1972", "Standard Methods for the Examination of Water and Wastewater", 14th Edition, 1975 (American Public Health Association, New York) or other methods approved by the department of natural resources.

Public Water Supply

Toxic substances narrative: The intake water supply will be such that by appropriate treatment and adequate safeguards it will meet the Public Health Service Drinking Water Standards, 1962.

Concentrations of other constituents must not be hazardous to health.

Wyoming⁵⁰

All

Not specified

All

Toxic substances narrative: Toxic or potentially toxic materials attributable to or influenced by the

State and Water Use

Criteria Values

activities of man shall not be present in any Wyoming surface waters in concentrations or combinations which would damage or impair the normal growth, function or reproduction of human, animal, plant or aquatic life. Unless otherwise specified in these Standards, maximum allowable concentrations shall be based on the latest edition of Quality Criteria for Water, published by EPA or its successor agency, and/or more generally accepted scientific information.

In those cases where maximum allowable concentrations must be determined through bioassay, the appropriate protocol and application factors as outlined in the latest edition of Standard Methods for the Examination of Water and Wastewater or other methods approved by the EPA shall be used. The bioassay shall be conducted with an ecologically or economically important sensitive resident specie in the most sensitive portion of its life cycle, if applicable, as a test organism. Makeup water for the analysis should be constituted so as to approximate the most probable chemical and physical characteristics of the receiving water in question. The observed 96-hour LC50 is then to be multiplied by an application factor, where established by EPA, to determine the "safe" concentrations for the compound in question. Where appropriate application factors have not yet been established, the method for deriving said application factor shall be that described in the latest edition of Standard Methods or other methods approved by EPA.

Toxic substances specifically designed to kill or eliminate problem-causing aquatic life (such as mosquito larvae or heavy plant growth in irrigation ditches) may be added to surface waters of the State provided such substances are administered in accordance with label directions. However, compliance with label directions shall not exempt any person from the penalty provisions of W.S. 35-11-901(b).

This Section shall not apply to the use of fish toxicants by the Wyoming Game and Fish Department.

American Samoa⁵¹

All

Maximum allowable pesticides concentrations shall conform to national guidelines as stated in the Quality Criteria for Water.

State and Water UseCriteria ValuesDistrict of Columbia⁵²

All

Toxic substances narrative: The waters of the District shall be free from substances attributable to point or non-point sources discharged in concentrations that injure, are toxic to or produce adverse physiological or behavioral responses in humans, plants or animals.

Those criteria listed under the category of Toxics shall be applicable only to protection of the designated beneficial use for periods of less than ninety-six (96) hours. The determination of the criteria needed to protect the beneficial use for a longer period of time shall be made on a case by case basis and may be more stringent.

Class C

Aldrin	0.4	(maximum µg/L)
Chlordane	0.0043	
DDT and Isomers	0.001	
Dieldrin	0.0019	
Endosulfan	0.01	
Endrin	0.0023	
Heptachlor	0.0038	
Toxaphene	0.01	

Class D

Aldrin	0.00007 ¹	(maximum µg/L)
Chlordane	0.0005 ¹	
DDT and Isomers	0.00 ¹	
Dieldrin	0.00007 ¹	
Endosulfan	75.0	
Endrin	1.0	
Heptachlor	0.0003 ¹	
Toxaphene	0.0007 ¹	

¹ A risk factor of 10^{-6} is associated with the criterion; the preferred level is absolutely none.

Waters shall be free from toxicants and other substances in concentrations that cannot be reduced to levels safe for distribution by the existing or presently proposed water treatment facilities which use these waters.

Guam⁵³

Concentrations of pesticides shall not exceed one percent (0.01) of the 24-hour LC_{50} value determined using the receiving water in question and the most sensitive species of aquatic organisms affected.

Where the concentration based on the LC_{50} data exceeds the recommended maximum concentrations, the maximum concentrations shall constitute the criteria.

State and Water Use

Criteria Values

For the listing of all pesticides (Organochlorides, Organophosphates, Carbamates, Herbicides, Fungicides, Defolliants, and Botanicals) please refer to the U.S. Water Quality Criteria "Blue Book".

Note:

The setting or publishing of maximum concentrations (limits) for specific pesticides and other toxics should in no way be construed as official approval or authorization for their use where such use is contrary to U.S. Environmental Protection Agency or other Federal or local regulations which now exist or may be enacted at some future time.

N. Mariana Islands⁵⁴

All Surface Waters

Aldrin-Dieldrin	0.003	(maximum ug/L)
Chlordane	0.004	
Demeton	0.100	
Endosulfan	0.001	
Endrin	0.004	
Heptachlor	0.001	
Lindane	0.004	
Malathion	0.001	
Methoxychlor	0.030	
Mirex	0.001	
Parathion	0.040	
Toxaphene	0.005	

Free from toxic or other deleterious substances at levels or in combinations sufficient to be toxic or harmful to human, animal, plant, or aquatic life, or in amounts sufficient to interfere with any beneficial use of the water.

Toxic substances narrative: Criteria for toxic substances are given as either a maximum concentration or are determined by multiplying the stated application factor by the concentration determined to be lethal to 50% of the most sensitive indigenous organism after 96 hours of exposure (96 LC₅₀). The 96 LC₅₀ values shall be determined by using the bioassay procedures consistent with those described in the latest edition of Standard Methods for the Examination of Water and Wastewater.

The 96 LC₅₀ values shall be determined by using the most sensitive indigenous organism to the substance in question. When both an application factor and a maximum concentration are given, the lesser of the two resulting concentrations shall constitute the water quality standards.

State and Water Use

Criteria Values

General Toxic Standards: No substance or combination of substances including oil and petroleum products shall be present in surface water in amounts that exceed 0.01 times the 96 LC₅₀ concentration unless it can be demonstrated to the Department that a higher concentration has no adverse effect, chronic or acute, on the intended uses of the water body in question.

General Considerations: Analytical testing methods for these criteria shall be in accordance with the most recent editions of Standard Methods for the Examination of Water and Wastewater, and other methods published by knowledgeable authorities and possessing adequate procedural precision and accuracy.

Effects of toxic or other deleterious substances at levels or combinations sufficient to interfere with any beneficial use of the water, shall be evaluated as a minimum by the use of a 96-hour bioassay as described in the most recent editions of Standard Methods for the Examination of Water and Wastewater. Survival of test organisms shall not be less than that in controls which utilize appropriate water. Failure to determine presence of toxic substances by this method shall not preclude determination of excessive levels of toxic substances on the basis of other criteria or methods.

Pollutant discharges shall be controlled so as to protect not only the waters receiving the discharge directly, but also those waters into which the initial receiving waters may flow.

Puerto Rico⁵⁵

SB, SC, and SD

Organochloride pesticide residues in surface and coastal waters shall not exceed 1/100 of the TLM 96 hours of approved species. In no case shall these pesticides exceed the following concentrations:

Aldrin-Dieldrin	0.002	(maximum ug/L)
Chlordane	0.004	
DDT	0.001	
Endosulfan	0.001	
Endrin	0.001	
Heptachlor	0.001	
Lindane	0.004	
Methoxychlor	0.020	
Mirex	0.001	
Toxaphene	0.005	
Perthane	0.070	

Organophosphorus and non-persistent pesticide residue

State and Water UseCriteria Values

in surface and coastal water shall not exceed 1/10 of the TLM 96-hours approved species.

Demeton	0.100	(maximum ug/L)
Guthion	0.010	
Malathion	0.100	
Parathion	0.004	
2,4-D	80.00	
2,4,5-TP(Silvex)	10.00	

All

Toxic substances narrative: The waters of Puerto Rico shall not contain any substance in a concentration which is toxic or which produces undesirable physiological responses in human, fish or other animal life, and plants.

The waters of Puerto Rico shall not contain two or more substances whose combination is toxic or which will produce chronic or other undesirable physiological responses in humans, fish or other animal life and plants.

Trust Territory⁵⁶

All

Aldrin	0.002	(maximum ug/L)
Dieldrin	0.002	
Chlordane	0.004	
Demeton	0.1	
DDT	0.001	
Endosulfan	0.001 (marine), 0.003 (Class 1 and 2)	
Endrin	0.004	
Guthion	0.01	
Heptachlor	0.001	
Lindane	0.004 (marine), 0.01 (Class 1 and 2)	
Malathion	0.1	
Methoxychlor	0.03	
Mirex	0.001	
Parathion	0.04	
Toxaphene	0.005	

Toxic substances narrative: Criteria for toxic substances are given as either a maximum concentration or are determined by multiplying the stated application factor by the concentration determined to be lethal to 50% of the most sensitive indigenous organism after 96 hours of exposure (96 LC). 96 LC values shall be determined by using bioassay procedures consistent with those described in the latest edition of Standard Methods for the Examination of Water and Wastewater. 96 LC 50 values shall be determined by using the most sensitive indigenous organism to the substance in question. When both an application factor and a maximum concentration are

State and Water Use

Criteria Values

given, the lesser of the two shall constitute the water quality standard.

No substance or combination of substances shall be present in surface waters in amounts that exceed 0.01 times the 96 LC₅₀ concentration unless it can be demonstrated to the Board that a higher concentration has no adverse effect, chronic or acute, on the intended uses of the water body in question.

General considerations:

(1) All methods of sample collection, preservation, and analysis used to determine compliance with these standards shall be in accordance with those specified in the current edition of Standard Methods for the Examination of Water and Wastewater or methods specified by the EPA in 40 CFR Part 136, as appropriate.

Samples should be collected at approximately equal intervals and under those conditions of tide, rainfall, and time of day when pollution is most likely to be a maximum.

(2) Whenever natural conditions are of a lower quality than an assigned water quality criteria, the natural conditions shall constitute the water quality criteria.

(3) Whenever 2 numeric criteria are in conflict, the more stringent criteria shall constitute the water quality criteria.

(4) Pollutant discharges to either surface or ground waters shall be controlled so as to protect not only the receiving water but also those waters into which the initial receiving waters may flow.

Virgin Islands⁵⁷

All

All surface waters shall be free of substances attributable to municipal, industrial, or other discharges or wastes in concentrations or combinations which are toxic or which produce undesirable physiological responses in human, fish, and other animal life, and plants.