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DEPARTMENT OF ENVIRONMENTAL PROTECTION

LAND USE MANAGEMENT

WATER MONITORING AND STANDARDS

Surface Water Quality Standards

Proposed Re-adoption with Amendments: N.J.A.C. 7:9B-1.4, 1.5, 1.6, 1.14, 1.15

Authorized By: Bradley M. Campbell, Commissioner,
Department of Environmental Protection

Authority: N.J.S.A. 58:10A-1 *et seq.*, 58:11A-1 *et seq.*, N.J.S.A.
13:1D-1 *et seq.*

Calendar Reference See Summary below for explanation of exception to
calendar requirement.

DEP Docket Number: 30-05-081545

Proposal Number: -----

Public hearings concerning this proposal will be held on **October 24, 2005** from
3:30 PM to 5:00 PM or close of testimony which ever occurs first and
6:00 PM to 7:00 PM or close of testimony which ever occurs first

at

Department of Environmental Protection
401 East State Street
Public Hearing Room
Trenton, NJ 08625

Submit written comments by **November 18, 2005**, to:

Gary J. Brower, Esq.
Attn. DEP Docket Number - 30-05-081545
Office of Legal Affairs
New Jersey Department of Environmental Protection
P.O. Box 402
Trenton, NJ 08625-0402

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The New Jersey Department of Environmental Protection (Department) requests that commenters submit comments on disk or CD as well as paper. Submission of a disk or CD is not a requirement. The Department prefers Microsoft Word 6.0 or above. MacIntosh formats should not be used. Each comment should be identified by the applicable N.J.A.C. citation, the commenter's name and affiliation following the comment.

Copies of this rule proposal can be downloaded electronically from the Department's web page at <http://www.state.nj.us/dep/rules>.

The agency proposal follows:

SUMMARY

As the Department has provided a 60-day comment period on this notice of proposal, this proposal is excepted from the rulemaking calendar requirement pursuant to N.J.A.C. 1:30-3.3(a)5.

The Department administers the Surface Water Quality Standards (SWQS) for the protection of surface water quality of the waters of the State. The Department develops and administers the SWQS pursuant to the Water Pollution Control Act, (WPCA), N.J.S.A. 58:10A-1 *et seq.*, the Water Quality Planning Act (WQPA), N.J.S.A. 58:11A-1 *et seq.*, and in conformance with requirements of the Federal Water Pollution Control Act, 33 U.S.C. §1251 *et seq.*, commonly known as the Clean Water Act (CWA), and the Federal regulatory program established pursuant to the CWA by the United States Environmental Protection Agency (USEPA) at 40 CFR 131. The SWQS include general requirements, use designations, classifications, antidegradation categories, and water quality criteria applicable to the surface waters of the State. The SWQS also address the Department's responsibilities to conduct a continuing planning process pursuant to Section 303 of the CWA, 33 U.S.C. § 1313, and Section 7 of the WQPA, N.J.S.A. 58:11A-7.

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The SWQS are utilized by New Jersey Pollutant Discharge Elimination System (NJPDES) (N.J.A.C. 7:14A) surface water discharge permitting program in the development of water quality-based effluent limitations (WQBEL) to protect or improve the existing water quality and designated uses. They are also utilized by the Department's Site Remediation Program (N.J.A.C. 7:26E) to ensure discharges flowing to surface water comply with the SWQS. The Land Use Regulation Program, through the Freshwater Wetlands Program, N.J.A.C. 7:7A, the Coastal Permitting Program, N.J.A.C. 7:7E, and the Stream Encroachment Program, N.J.A.C. 7:13, also utilizes the SWQS to establish permit requirements.

In July 1994, the Department entered into a Consent Agreement with the Association of Environmental Authorities (AEA) concerning its appeal of certain components of the SWQS (See 25 N.J.R. 5569(a); December 6, 1993). Pursuant to the terms of the Consent Agreement, the Department agreed to review and as appropriate, amend the SWQS, revising its regulations concerning mixing zones for enterococcus bacteria, antidegradation policies, expression of existing water quality criteria for metals as dissolved metals (including the water effects ratio concept); recalculation of aquatic life protection criteria for lead; point of application of the freshwater human health criteria; basis for human health lead criteria; averaging periods for ammonia, chlorine, and metals criteria; detection levels for chemical-specific parameters limited in NJPDES permits; application factors used to implement acute and chronic whole effluent toxicity (WET) limitations; and procedures to develop site-specific aquatic life protection criteria.

Since entering into the Consent Agreement with AEA, the Department has modified the SWQS and has taken other actions to protect and preserve the State's waters. The Department readopted the SWQS on May 18, 1998 (30 N.J.R. 1778(a)) with a chapter expiration date of April 18, 2003. In 2002, after consultation with stakeholders, the Department adopted amendments updating and improving various aspects of the SWQS. Amendments adopted at that time included changes to regulatory mixing zone provisions, addition of metal translators, revised stream classifications, aquatic life protection criteria for ammonia and lead, and revised human health criteria for PCBs. (See 34 N.J.R. 537(a); January 22, 2002). To allow the

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Department time to fully evaluate the SWQS as part of a re-adoption of the chapter, the expiration date was extended to August 17, 2005 (See 35 N.J.R. 2264(a); May 19, 2003 and 37 N.J.R. 1887(a); May 16, 2005).

Since the adoption of the January 2002 amendments referenced above, the Department also adopted several amendments upgrading the stream classification and/or antidegradation designation of the surface waters of New Jersey.

- On May 18, 2003 the Department upgraded 15 waterbodies to Category One, based on "exceptional ecological significance" and "exceptional water supply significance" (35 N.J.R. 2264(b); May 18, 2003).
- On November 3, 2003 the Department upgraded several stream classifications based on trout status, and upgraded a portion of the Paulins Kill to Category One based on "exceptional ecological significance" including the need to protect the presence of the Dwarf Wedgemussel, an endangered species. (35 N.J.R. 5086(a); November 3, 2003).
- On August 2, 2004 the Department adopted Category One antidegradation designation for seven streams including both named and unnamed tributaries based on "exceptional ecological significance". Significant drainage areas of the Manasquan River, Metedeconk River and natural drainage to the Oradell Reservoir were also upgraded to Category One antidegradation designation based upon "exceptional water supply significance". In addition, the stream classification for two stream segments was upgraded to FW2-TP(C1) based on the trout status. The Department also upgraded the South Branch Rockaway Creek from FW2-TM(C1) to FW2-TP(C1) based on confirmation of trout production in this waterbody (36 N.J.R. 3565(c); August 2, 2004).
- On June 20, 2005, the Department adopted amendments to upgrade the antidegradation designation of the non-tidal portion of the Shark River Brook as Category One based on "exceptional water supply significance". The Department also adopted the use classifications of the Shark River Brook as freshwater (FW2) and the tidal portion of Shark River as saline estuarine water (SE1) (37 N.J.R. 2251(a); June 20, 2005).

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The previous amendments were intended to address various issues and improve the SWQS in a number of ways.

The United States Fish and Wildlife Service prepared a Biological Opinion (*Biological opinion on the effects of the U.S. Environmental Protection Agency's approval of the State of New Jersey's surface water quality standards on the bald eagle, peregrine falcon, and dwarf wedgemussel*. U.S. Department of the Interior, Fish and Wildlife Service (USFWS), New Jersey Field Office, Pleasantville, New Jersey, 1996) as part of the 1994 approval of the New Jersey SWQS triennial review process. A copy of this document can be obtained from the Department of Environmental Protection, Bureau of Water Quality Standards and Assessment, P.O. Box 409, Trenton, NJ 08625. The USFWS determined New Jersey's SWQS were not adequate to protect these threatened and endangered species and identified changes that were needed to the mixing zone provisions, antidegradation policy and criteria for compounds with a high potential for bioaccumulation.

To address the USFWS concern with New Jersey's mixing zone requirements, in the 2002 amendments reference above, the Department added a new provision at N.J.A.C 7:9B-1.5(h)5iv which prohibits mixing zones to areas with documented occurrences of any threatened and endangered species, if those discharges would likely have an adverse effect on the species or its associated habitat (34 N.J.R. 537(a)). In addition, the Department has upgraded the antidegradation designation for several stream segments to protect threatened and endangered species, specifically dwarf wedgemussels. (See 35 N.J.R. 2264(b), 35 N.J.R. 5086(a), and 36 N.J.R. 3565(c)).

The lack of wildlife criteria for DDT and its metabolites, mercury, and PCBs was a concern to the USFWS. DDT and its metabolites, mercury, and PCBs are bioaccumulative pollutants that are persistent in the environment, accumulate in biological tissues, and biomagnify in the food chain. Due to these characteristics, the concentration of these contaminants may increase as they are transferred up through various food chain levels. As a

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result, adverse impacts to non-aquatic, piscivorous (fish-eating) organisms may arise from low surface water concentrations.

An inter-agency committee (NJDEP, USEPA, and USFWS) was assembled to derive New Jersey-specific wildlife water quality criteria for mercury, PCBs, and DDT and its metabolites that would minimize the adverse effects of these pollutants on the bald eagle and peregrine falcon. The dwarf wedgemussel was not included in the calculation of water quality criteria for the protection of wildlife because, with its lower trophic level, the danger of contaminant biomagnification should be less than with a higher trophic level organism in the food chain. As indicated in the inter-agency committee report on derivation of the wildlife criteria, the State's aquatic life-based criteria are intended to provide the necessary level of protection for these mussels (See *Derivation of New Jersey-Specific Wildlife Values as Surface Water Quality Criteria for: PCBs, DDT, and mercury*. September 2001, <http://www.state.nj.us/dep/wmm/sgwqt/wildlifecriteria0901.pdf>). The Department proposed wildlife criteria in November 2002. However, these criteria were not adopted due to implementation concerns raised during the public comment period. The Department published its decision not to adopt these criteria on February 17, 2004 in the New Jersey Register (36 N.J.R. 912(a)) and at that time committed to develop an implementation plan before it adopted the criteria. The Department is not reproposing wildlife criteria for mercury, PCBs and DDT at this time, but is adding a new provision at N.J.A.C. 7:9B-1.5(e)7 to require monitoring using more sensitive analytical methods.

The re-adoption of the SWQS and the amendments proposed at this time address several items from the Consent Agreement with AEA, the USFWS Biological Opinion as well as other items. The Department is proposing re-adoption with amendments to antidegradation implementation policies, revised criteria for bacterial indicators, new temperature criteria for trout production waters, new and revised aquatic life-based and human health based criteria, and upgraded stream classification and/or antidegradation designations based on the trout sampling data. The amendments reflect the Department's continuing effort to manage the State's water

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resources in a comprehensive manner to assure that clean water is preserved and maintained and that the State's drinking water needs are met.

The Department is not proposing any amendments to the metal translators at N.J.A.C. 7:9B-1.5(c)6. These translators are used to convert the water quality criterion, which is expressed as “dissolved”, into an effluent limit based on “total recoverable.” The Department plans to re-codify the provisions concerning these translators into the NJPDES regulations at N.J.A.C. 7:14A. At that time, and as part of that future action, the Department will propose to delete provisions concerning metal translators from the SWQS.

In addition, the Department is not proposing any changes to the nutrient provisions, N.J.A.C. 7:9B-1.5(g), at this time. As part of this evaluation, the Department considered the written comments from permittees to re-evaluated its nutrient policies. Based upon the review, the Department has determined that the nutrient provisions and the options they contain, are adequate and appropriate for the control of phosphorus discharged to State's freshwater streams and lakes.

The promulgated nutrient criteria at N.J.A.C. 7:9B-1.14(c) are used in assessing water quality conditions as well as developing Water Quality Based Effluent Limitations for NJPDES dischargers. Where the numeric criteria are exceeded, the waterbody is listed as impaired pursuant to Section 303(d) of the Federal Clean Water Act (CWA 33 U.S.C. § 1313). The Department is required to develop TMDLs for impaired waterbodies on the 303(d) list.

For phosphorus, N.J.A.C. 7:9B-1.14(c)5 provides that unless the phosphorus is discharged to a lake, a site-specific criteria has been developed as part of a TMDL. Phosphorus shall not exceed 0.1 mg/L in any stream, unless it can be shown that total phosphorus is not a limiting nutrient and will not otherwise render the water unsuitable for the designated uses. The Department recognizes that there may be situations where the numeric phosphorus criteria are exceeded in receiving water but there are no nutrient-related problems in the waterbody. To address this concern, the Department provides NJPDES permittees the option of conducting a

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water quality study to demonstrate that the phosphorus concentration does not render the waterbody unsuitable for its designated uses. The requirements for this study is outlined in the Department's *Technical Manual for Phosphorus Evaluations N.J.A.C. 7:9B-1.14(c) for NJPDES Discharge to Surface Water Permits*, March 2003, available at <http://www.state.nj.us/dep/dwq/techmans/phostcml.pdf>. If the permittee successfully demonstrates that the phosphorus concentration does not render the waters unsuitable, the Department may modify or remove the phosphorus effluent limit. However, this permit evaluation focuses on near field impacts, it is possible that, through the development of a Total Maximum Daily Load (TMDL), the Department could later impose a phosphorus limit on this same permittee because the TMDL evaluates far field impacts. For example, while the phosphorus concentration does not cause water quality problems in the immediate receiving waterbody, that stream may flow into a downstream reservoir which experiences excessive algal growth.

The Department expects that the ongoing research may provide a basis for refinement of New Jersey's numerical nutrient criteria. For example, New Jersey is also pursuing research to develop response-based criteria (for example, chlorophyll a levels, aquatic community composition indices, and diurnal dissolved oxygen fluctuations) which more clearly identify the presence of nutrient-related water quality impairments.

The Department is considering different measures to expand the antidegradation policy for nonpoint sources of pollution. The Department is publishing a notice elsewhere in this issue of the New Jersey Register seeking public comment on potentially requiring new or expanded development to maintain a riparian zone.

The following is a summary of the existing rules at N.J.A.C. 7:9B proposed for re-adoption and of the substantive proposed changes:

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N.J.A.C. 7:9B-1.1, Scope of subchapter, sets forth the scope of N.J.A.C. 7:9B with respect to the protection and enhancement of the surface water resources of the State of New Jersey. The Department is readopting this section without change.

N.J.A.C. 7:9B-1.2, Construction, states that the chapter shall be liberally construed to permit the Department and its various divisions to discharge their statutory functions. The Department is readopting this section without change.

N.J.A.C. 7:9B-1.3, Severability, states that if any portion of the SWQS is found to be invalid, the remainder of the chapter shall not be affected. The Department is readopting this section without change.

N.J.A.C. 7:9B-1.4, Definitions, contains definitions used in this chapter. A description of the proposed changes to the section follows:

The Department is proposing a new definition of the term "best management practices" or "BMPs." BMPs are methods, practices, or measures used to prevent or reduce the amount of pollution of waters of the State from point and non-point sources. BMPs include structural and nonstructural controls, operations, and maintenance procedures that can be applied before, during and after pollution producing activities to reduce or eliminate the introduction of pollutants into receiving waters. The Department is proposing this definition because the term is used in the existing rules at N.J.A.C. 7:9B-1.5(g) as part of nutrient policies and at N.J.A.C. 7:9B-1.9, which are the procedures for modifying water quality-based effluent limitations for individual dischargers to Category Two waters. The BMPs are to be practiced as part of antidegradation implementation for non-point sources of pollution. The proposed definition of BMPs is consistent with the definition of this phrase in the Water Quality Management Planning Rules, N.J.A.C. 7:15.

The Department is proposing to amend the definition of "calculable changes" by combining it with the definition of "measurable changes" and repealing the separate definition of

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"measurable changes." Combining these two definitions will help to avoid confusion. The definition of "calculable changes" as proposed means any detectable changes, including predictable changes to water quality that fall outside of the 95% confidence interval of the mean water quality based on an acceptable mathematical predictive model or sampling and analysis conducted in accordance with methods approved by the USEPA in 40 CFR 136 or other Department approved methods. The Department has historically applied the 95% confidence interval in Category One waters to measure mean water quality in order to implement the measurable and calculable change provision in the existing SWQS. Using the 95% confidence interval of the demonstrated mean water quality in all cases would simplify the process of determining whether a discharge is likely to cause a change in water quality.

The Department is proposing new definitions of the terms "carcinogen" and "non-carcinogen." These definitions incorporate the traditional USEPA group categorizations of the types of carcinogens (Groups A, B, and C) and non-carcinogens (Groups D and E), and will incorporate narrative descriptions of carcinogenic classes that USEPA has proposed to use in the future and in some instances is using now. For example, USEPA has indicated that it will replace Group B with "likely to be carcinogenic to humans." (*1999 Guidelines for Carcinogenic Risk Assessment Review Draft*. NCEA-F-0644). The *Guidelines for Carcinogenic Risk Assessment* were issued on March 29, 2005 (EPA/630/P-03/001F) and Notice of Availability was published in the Federal Register (70 Fed. Reg. 17766, April 7, 2005 found at <http://www.epa.gov/cancerguidelines>). These Guidelines provide a framework for assessing possible cancer risks from exposures to pollutants or other agents in the environment. Consistent with the implementation direction provided by the USEPA (Memorandum from Acting Administrator Stephen L. Johnson to USEPA staff on Application of New Cancer Guidelines, March 29, 2005) for risk assessments that have been completed before issuance of the new Guidelines, both the prior carcinogenicity categorization and narrative descriptors are recognized. The characterization of a toxic substance as either a "carcinogen" or "non-carcinogen" is used throughout these rules, and specifically at N.J.A.C. 7:9B-1.14(c) in surface water quality criteria calculations for the protection of human health. These proposed definitions

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are consistent with definitions of these terms proposed in the Department's Ground Water Quality Standards. (See 36 N.J.R. 4374(b), October 4, 2004).

The Department is proposing to modify the definition of "Category one waters" to replace the phrase "measurable changes" with "calculable changes" because measurable changes is no longer used in the proposed amendments to the rule. Changes have been proposed to amend the definition of calculable changes as explained above.

The Definitions of "Epilimnion" and "Hypolimnion" are being proposed for deletion because these terms are no longer used in the rule.

The Department is proposing a new definition of "necessary and justifiable social or economic development" as part of the proposed antidegradation analysis at N.J.A.C. 7:9B-1.5(d), and the variance provisions at N.J.A.C. 7:9B-1.8 and 1.9. The proposed definition of "necessary and justifiable social or economic development" specifies the different projects and developments that may be eligible for a lowering of water quality. The Department is proposing to define projects located in areas designated for growth pursuant to the State Development and Redevelopment Plan (SDRP), N.J.S.A. 52:18A-196 *et seq.*, as projects that qualify as necessary and justifiable social or economic development. The SDRP specifies that growth should occur in Metropolitan Planning areas (Planning Area 1), Suburban Planning Areas (Planning Area 2), and Designated Centers in any planning area. The Department has also determined that projects needed to protect public health and safety, and new and expanded public institutions are necessary and justifiable and should also be eligible for a lowering of water quality.

The Department is proposing a definition of the term "substantial economic impact." Pursuant to proposed N.J.A.C. 7:9B-1.5(d)4iii(2), the Department may authorize a lowering in water quality in a Category Two stream if the cost to prevent the lowering of water quality would result in substantial economic impact to the affected community. Under the definition, an impact is considered a "substantial economic impact" when the cost of a proposed alternative exceeds the community or private company's ability to pay. The Department will utilize the USEPA's

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guidance (*Interim Economic Guidance for Water Quality Standards Workbook* EPA-823-B-95-002 March 1995) that can be found at <http://www.epa.gov/waterscience/criteria/> to determine whether the costs to prevent a lowering of water quality would result in “substantial economic impact.” The USEPA’s Economic guidance document provides guidance to States and EPA regions responsible for reviewing requests for variances and modifications to designated uses, and for approval of antidegradation analyses and describes the types of information and analyses that should be considered by applicants and reviewers. The new definition of "substantial economic impact" is used as part of the antidegradation implementation policies proposed at N.J.A.C. 7:9B-1.5(d). For further information on the “substantial economic impact,” please see discussion on antidegradation analysis below.

The Department is proposing to define the term "water effect ratio" or "WER" to mean the ratio of an acute (or chronic) toxicity value derived from a site study to the acute (or chronic) toxicity value derived from a laboratory study for a particular toxic substance. A WER is a criterion adjustment factor accounting for the effect of site-specific water characteristics on pollutant bioavailability and toxicity to aquatic life. The WER is multiplied by the appropriate state-wide aquatic criterion to derive a site-specific criterion. The Department is proposing to use a default WER of 1 for all proposed metals criteria as part of this rulemaking as recommended by the USEPA (*1999 Water Quality Standards; Establishment of Numeric Criteria for Priority Toxic Pollutants; States' Compliance-Revision of Polychlorinated Biphenyls (PCBs) Criteria*; Final Rule. 64 Fed. Reg. 61182 (<http://www.epa.gov/fedrgstr/EPA-WATER>)).

N.J.A.C. 7:9B-1.5, Statements of policy, includes the policies applicable to the protection and enhancement of surface water resources throughout the State. These include general, interstate, general technical, antidegradation, water quality-based effluent limitation (WQBEL), bioassay and biomonitoring, nutrient policies, and mixing zones. A description of the proposed changes to N.J.A.C. 7:9B-1.5 follows:

N.J.A.C. 7:9B-1.5(a)5. The Department is proposing to amend this section to clarify the derivation of human health based ambient criteria in freshwaters and saline waters for

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carcinogens and non-carcinogens. Exposure assumptions are based upon the designated uses of the waterbody. The Department is therefore clarifying that in freshwaters, exposure is assumed based upon the consumption of fish and water, and in saline waters, on the consumption of fish. In general, the Department establishes a carcinogenic-based criterion which would result in no greater than a one-in-one-million lifetime excess cancer risk. If the substance is a non-carcinogen, the criteria will be based on non-carcinogenic effects, using the reference dose to establish criteria which would result in no appreciable risk of deleterious effect. For further discussion of the derivation of these criteria, please refer to the Department's discussion of human health criteria at N.J.A.C. 7:9B-1.14(f), below.

N.J.A.C. 7:9B-1.5(b)1 The Department is proposing to amend this section, which concerns the designated uses and water quality criteria for the fresh and saline waters under the jurisdiction of the Delaware River Basin Commission by deleting "and 1.14(d)" and replacing it with "through (g)" to be consistent with other proposed amendments to N.J.A.C. 7:9B-1.14.

N.J.A.C. 7:9B-1.5(b)2 The Department is proposing to replace the name of the Interstate Sanitation Commission with the current name of Interstate Environmental Commission at N.J.A.C. 7:9B-1.5(b)2.

N.J.A.C. 7:9B-1.5(c)2 The Department is proposing to amend the design flow provisions by listing each design flow individually instead of aggregating them in one paragraph at N.J.A.C. 7:9B-1.5(c)2. This proposed change is only a modification of the format and does not include any changes to design flows.

N.J.A.C. 7:9B-1.5(c)7 The Department is proposing to amend and recodify the existing provision at N.J.A.C. 7:9B-1.14(c)1iv regarding sampling methods for bacterial quality to proposed N.J.A.C. 7:9B-1.5(c)7. This new provision provides that the Department will utilize the geometric mean of bacterial quality to assess compliance with the bacterial quality indicators at N.J.A.C. 7:9B-1.14(d)1ii-iii. The Department will use a geometric mean to assess water quality, regulate wastewater discharges and to develop TMDLs. The new provision also restates

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the sample monitoring frequency for calculating the geometric mean for bacterial quality as a requirement. A minimum of five samples collected over a period of 30 days will be used to calculate the geometric mean. The single sample maximum (SSM) will be used for beach notification and to identify where additional ambient water quality sampling is needed to calculate a geometric mean.

Criteria for bacterial indicators are used for several purposes under the CWA. Adoption of both a geometric mean and a SSM value for enterococcus and E. coli gives the Department added flexibility in implementing bacteria criteria when developing water quality based effluent limits, determining whether a waterbody is attaining its water quality standards, developing TMDLs for impaired waters, and beach notification. Although the USEPA promulgated the SSM values for Coastal and Great Lakes Recreation Waters (*Water Quality Standards for Coastal and Great Lakes Recreation Waters*; Final Rule; 69 Fed. Reg. 67218; November 16, 2004, <http://www.epa.gov/fedrgstr/EPA-WATER>), the USEPA in the rule summary recommended that SSM be used for beach notification (open and closure decisions). Following USEPA's guidance, the Department anticipates using the proposed SSM value of 104/100ml for making routine decisions to open or close bathing beaches. In New Jersey, the Department of Health and Senior Services oversees the opening and closing of designated bathing areas (lifeguarded beaches) and has also adopted an enterococcus value of 104/100ml for decision-making regarding the opening and closing of designated bathing areas in coastal waters (See N.J.A.C. 8:26-7.18(d)1). Health authorities participating in the Cooperative Coastal Monitoring Program are required to collect samples at designated bathing beaches and analyze these samples for enterococcus. If the results indicate an exceedence of the SSM, the bathing beach must be resampled. If the retest indicates compliance with the SSM, the beach remains open for swimming. If the retest sample exceeds the SSM, the beach is closed until it can be demonstrated that the waters are safe for swimming. In non-bathing beach areas, the Department also anticipates using the proposed SSM as a trigger to collect additional data if there is insufficient data to determine a geometric mean. The geometric mean will be used to assess the overall quality of the water. The geometric mean will be the criteria used as the goal in TMDLs unless the TMDL is located in a designated bathing area.

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N.J.A.C. 7:9B-1.5(c)8 The Department is proposing to move technical policies regarding temperature from existing N.J.A.C. 7:9B-1.14(c)11 to N.J.A.C. 7:9B-1.5(c)8 to clarify the implementation of temperature criteria. The Department is removing the distinction between hypolimnion or epilimnion because, under proposed N.J.A.C. 7:9B-1.5(c)8ii, thermal alteration is permitted only if it can be proven beneficial irrespective of whether the discharge location is into the hypolimnion or epilimnion.

N.J.A.C. 7:9B-1.5(d) N.J.A.C. 7:9B-1.5(d) contains the Department's antidegradation policies applicable to all surface waters of the State. The purpose of the antidegradation policies is to maintain and protect existing uses and water quality. Federal antidegradation requirements at 40 CFR 131.12 require states to develop, adopt, and implement a statewide antidegradation policy. Antidegradation standards ensure that the level of water quality needed to protect existing uses is maintained. In addition, water quality better than necessary to protect existing uses shall be maintained and protected unless lower water quality is necessary to accommodate important economic or social development in the area. With respect to antidegradation policies applicable to non-point sources, states are to assure that "all cost effective and reasonable best management practices for non-point source control shall be achieved." The Department is proposing amendments to N.J.A.C. 7:9B-1.5(d) to clarify the implementation policies and to specify exemptions. Re-codification, formatting and typographical corrections have also been made, as necessary.

As part of the re-ordering of N.J.A.C. 7:9B-1.5(d), the Department is proposing a new sub-paragraph at N.J.A.C. 7:9B-1.5(d)1i that clarifies that the presence of Threatened and Endangered species, as defined by the Endangered Species Act of 1973, 16 USC 1531 *et seq.* and the New Jersey Endangered and Nongame Species Conservation Act of 1973, N.J.S.A. 23:2A-1 *et seq.* is an existing use that must be protected. This new sub-paragraph addresses one of the findings of United States Fish and Wildlife Service' (USFWS) Biological Opinion Document (*Biological opinion on the effects of the U.S. Environmental Protection Agency's approval of the state of New Jersey's surface water quality standards on the bald eagle,*

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peregrine falcon, and dwarf wedgemussel. U.S. Department of the Interior, Fish & Wildlife Service, New Jersey Field Office, Pleasantville, New Jersey. 1996). A copy of this document can be obtained from the Department of Environmental Protection, Bureau of Water Quality Standards and Assessment, P.O. Box 409, Trenton, NJ 08625.

The USEPA and the USFWS are reviewing the existing CWA 304(a) aquatic criteria pursuant to a 2001 Memorandum of Agreement (*Memorandum of Agreement Between the Environmental Protection Agency, Fish and Wildlife Service and National Marine Fisheries Service Regarding Enhanced Coordination Under the Clean Water Act and Endangered Species Act.* 66 Fed. Reg. 11202, February 22, 2001) (<http://www.epa.gov/fedrgstr/EPA-WATER>) to determine if the aquatic criteria are adequately protective of threatened and endangered species. Through this joint review, USEPA will recommend revisions if the existing aquatic criteria are deemed not adequately protective. Until the comprehensive review is complete, the USEPA has determined, and has advised that the existing aquatic criteria are protective of threatened and endangered species. Therefore, the Department intends to develop effluent limitations for NJPDES permits using the existing aquatic life criteria at N.J.A.C. 7:9B-1.14 until USEPA recommends new 304(a) criteria to protect threatened and endangered species.

The Department is recodifying existing N.J.A.C. 7:9B-1.5(d)3 and 4 as N.J.A.C. 7:9B-1.5(d)1ii and iii. No change in text is proposed. In addition, the Department is recodifying existing N.J.A.C. 7:9B-1.5(d)7 through 9 as N.J.A.C. 7:9B-1.5(d)iv through vi. The Department is adding a new N.J.A.C. 7:9B-1.5(d)1vii to clarify that the antidegradation policies may be applied during one or more regulatory phases including Water Quality Management Planning (under N.J.A.C. 7:15), Total Maximum Daily Load (TMDL) development (under N.J.A.C. 7:15), and any of the Department's permitting programs.

The Department is slightly modifying the existing N.J.A.C. 7:9B-1.5(d)6, which specifies the antidegradation standards that are applicable to waters classified in each of the antidegradation designations tiers and recodifying it at N.J.A.C. 7:9B-1.5(d)2. The waters of the State are each assigned an antidegradation designation based upon the level of protection

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The Department is adding a new N.J.A.C. 7:9B-1.5(d)3 which identifies a variety of activities that are not subject to an antidegradation review. The types of projects described in (d)3 are not expected to result in a permanent calculable change in water quality, and are, therefore, appropriate for exclusion. Included at N.J.A.C. 7:9B-1.5(d)3 are short term, temporary activities. The Department is also proposing to exempt emergency response activities and certain site remediation activities from antidegradation review under the proposed N.J.A.C. 7:9B-1.5(d)3ii and iii because the Department has determined that these activities are necessary and should result in long term water quality improvement rather than degradation. Left untreated, contaminants will enter the receiving stream. Therefore, properly treated wastewater discharges associated with these types of remedial actions should improve water quality. In the context of approving these activities, the Department may require certain actions to limit negative impacts on the receiving stream. For example, in approving a temporary activity, the Department may restrict its timing to limit its impact on water quality. In addition, at N.J.A.C. 7:9B-1.5(d)3iv the Department is proposing to exempt from an antidegradation review transfers of water for water supply purposes, if otherwise approved by the Department. Such water transfers, if consistent with the Water Supply Master Plan, adopted pursuant to the Water Supply Management Act, N.J.S.A. 58:11A-1 *et seq.*, or the Highlands Water Protection and Planning Act, N.J.S.A. 13:20-1 *et seq.*, have already been found to be necessary to protect public health and safety to ensure adequate supplies of drinking water in the State.

In addition, at N.J.A.C. 7:9B-1.5(d)3v the Department is proposing to exempt several types of NJPDES permit actions from antidegradation review because these actions are not expected to result in a calculable change in water quality. Specifically at N.J.A.C. 7:9B-1.5(d)3v(1), the Department is proposing to exempt NJPDES permit renewals that do not increase the loading of pollutants, as these are not a new or expanded discharge. This exemption include industrial discharge permits with production-based effluent limitation, which would allow the Department to take into account temporary reductions in operation and authorize an increase up to a previously approved production level without a new antidegradation review. Increases beyond the previously approved levels would be considered a new or expanded discharge subject to an antidegradation review.

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The Department is also proposing to exempt at N.J.A.C. 7:9B-1.5(d)3v(2) authorizations under general permits issued pursuant to N.J.A.C. 7:14A-6.13 if an antidegradation finding has been included in the draft general permit. By evaluating the compliance with the antidegradation policies in the development of the requirements in the general permit and the scope of eligibility, an additional site-specific evaluation should not be necessary when eligible facilities apply for coverage under a specific general permit. No new authorizations will be issued under the existing general permits unless the activity qualifies for an exemption under N.J.A.C. 7:9B-1.5(d)3i through iv until the general permit is reissued and includes an antidegradation finding. For example, the Department could authorize a new discharge under the existing General Petroleum Product Cleanup (B4B) and the General Remediation Cleanup (BGR) because the activity is exempt from an antidegradation review pursuant to N.J.A.C. 7:9B-1.5(d)3iii, provided that the proposed receiving stream would otherwise be impacted. New discharges that can not be authorized under the existing general permits would be required to seek an individual NJPDES permit.

The Department's mandate with respect to managing and protecting the State's natural resources is grounded in various statutes, including: the Department's enabling legislation (N.J.S.A. 13:1D-1 *et seq.*), the Water Pollution Control Act (N.J.S.A. 58:10A-1 *et seq.*), and the Water Quality Planning Act (N.J.S.A. 58:11A-1 *et seq.*). The Legislature, in the Water Pollution Control Act at N.J.S.A. 58:10A-2, stated that "it is the policy of the State to restore, enhance and maintain the chemical, physical, and biological integrity of the State's waters, to protect public health, to safeguard fish and aquatic life, scenic and ecological values, and to enhance the domestic, municipal, recreational, industrial and other uses of water."

In the Water Quality Planning Act, the Legislature declared that "the people of the State have a paramount interest in the restoration, maintenance and preservation of the quality of the waters of the State for the protection and preservation of public health and welfare, food supplies, public water supplies, propagation of fish and wildlife, agricultural and industrial uses, aesthetic satisfaction, recreation, and other beneficial uses; . . . the severity of the water pollution

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problem in the State necessitates continuing water quality management planning in order to develop and implement water quality programs in concert with other social and economic objectives; . . . water quality is dependent on factors of topography, hydrology, population concentration, industrial and commercial development, agricultural uses, transportation and other such factors which vary among and within watersheds and other regions of the State; and . . . pollution abatement programs should consider these natural and man-made conditions that influence water quality” (N.J.S.A. 58:11A-2a).

In the Water Quality Planning Act, the Legislature directed the Department to conduct a continuing planning process to, among other things, develop a Statewide implementation strategy to establish water quality goals and achieve the water quality standards (N.J.S.A. 58:11A-7). In N.J.S.A. 58:11A-5(c) the Legislature specifically authorized the establishment of a regulatory program to provide control or treatment of all point and non-point sources of pollution, including in-place or accumulated pollution sources to the extent practicable; to regulate the location, modification, and construction of any facilities within such area which may result in any discharge, and to assure that any industrial or commercial wastes discharged into any treatment works in such area meet the applicable pre-treatment requirements. The Water Quality Planning Act at N.J.S.A. 58:11A-5(f)-(i) also mandates that the regulatory process identify a process to identify and control, to the extent feasible, all point and non-point sources of pollution associated with agriculture, mining and construction activity and to identify and control saltwater intrusion into rivers, lakes and estuaries resulting from reduction of fresh water flow from any cause, including irrigation, obstruction, ground water extraction and diversion. The proposed antidegradation implementation policies are consistent with and further these legislative directions.

In the State Planning Act, the Legislature declared that New Jersey needs sound and integrated Statewide planning to conserve its farmland and natural resources, revitalize its urban centers, protect its environment, and provide needed housing and adequate public services at reasonable cost while promoting beneficial economic growth (N.J.S.A.52:18A-196). To that end, the Legislature requires the State Planning Commission to draft the State Development and

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Redevelopment Plan (SDRP), which was readoted in 2001 after a lengthy negotiation and public input process known as "cross acceptance" N.J.S.A. 52:18A-202 and 202.1. The SDRP contains policies which incorporate the general goals of the State Planning Act, and blend State, regional, and local plans into a Statewide map depicting growth areas and areas designated for less intensive growth.

The purpose of the State Plan is to "provide a coordinated, integrated, and comprehensive plan for the growth, development, renewal, and conservation of the State and its regions and which shall identify areas for growth, agriculture, open space conservation, and other appropriate designations." N.J.S.A. 52:18A-199a. It takes into account other state, county, and municipal land use and other development plans, and must "coordinate planning activities and establish Statewide planning objectives" in enumerated areas of development. N.J.S.A. 52:18A-200c, 200f.

There are five planning areas in the State. These planning areas provide a balance between growth and conservation. Areas for growth are areas designated Metropolitan Planning Area, PA1, Suburban Planning Area, PA2, and Designated Centers in any area. Areas for limited growth include Fringe Planning Area, PA3, Rural Planning Area, PA4, and Environmentally Sensitive Planning Area, PA5. These areas, planning should promote a balance of conservation and limited growth, recognizing that environmental constraints affect development and preservation is to be encouraged in large contiguous tracts. Areas for conservation include PA3, PA4, and Pa5.

The State Planning Commission has established boundaries for Planning Area, which are large masses of land distinguished by certain overall characteristics such as population density, land use, and environmentally sensitive features. The State Planning Commission also approves community development boundaries for centers, which are areas into which development is already or should be directed and concentrated, and recognizes cores and nodes as areas of already concentrated development either as part of centers or in the more heavily developed areas of the State. The State Plan boundaries for Planning Area, centers, cores and nodes were

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drawn after a lengthy public process that extended over a five-year period, including hundreds of meetings among municipal, county, and State officials, and involved the submittal of thousands of documents from public officials and private organizations and individuals.

The Department has carefully examined those boundaries, the purposes for which they were established, and the factors that determined how the lines were drawn in order to determine whether the Department could utilize the Planning Areas in these rules. Based on its examination, the Department has determined that the boundaries are in keeping with the purposes of the Water Pollution Control Act and the Water Quality Planning Act.

In enacting the Water Quality Planning Act, the Legislature acknowledged that several factors, some of which fall outside the traditional purview of the Department, directly and indirectly affect water quality. These factors include, but are not limited to, "topography, hydrology, population concentrations, industrial and commercial development, agricultural uses, and transportation" (N.J.S.A. 58:11A-2a). Therefore, in order to sufficiently protect and preserve "public health and welfare, food supplies, public water supplies, propagation of fish and wildlife, agricultural and beneficial uses, aesthetic satisfaction, recreation, and other beneficial uses" of the State's water resources, the Legislature specifically directed the Department to develop and implement water quality programs "in concert with other social and economic objectives." N.J.S.A. 58:11A-2a.

Thus the Department was required to develop a "continuing planning process" to encourage, direct, supervise, and aid areawide Water Quality Management Planning, and incorporate areawide Water Quality Management plans into a comprehensive and cohesive Statewide program directed toward the achievement of water quality objectives. The continuing planning process is to be coordinated and integrated with related Federal, State, regional, and local comprehensive land use, functional and other relevant planning activities, programs and policies." (See N.J.S.A. 58:11A-2(b)).

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There is significant overlap between the goals and objectives of the State Planning Act and the goals and objectives of the Water Quality Planning Act. Of particular significance, both statutes contain policies designed to protect water quality and conserve natural resources in the context of a Statewide planning framework. Thus, although the SDRP is not itself a regulatory document the Department believes it is necessary and appropriate under the Water Quality Planning Act to require coordination and integration of water quality management planning with the SDRP (and other relevant State, regional, and local plans) in order to achieve the water quality objectives of N.J.S.A. 58:11A-2.

It is against this backdrop that the Department now proposes to incorporate by reference the Planning Areas and Designated Centers in the State Plan into the Department's antidegradation implementation policies. The Department believes such an approach is consistent with the State Planning Act, the Water Quality Planning Act, the Water Pollution Control Act, and the Department's general powers. In this way the Department appropriately and closely coordinates the allowance of lower water quality associated with development with the overall planning objectives articulated in the State Plan. The proposed definition of "necessary and justifiable social or economic development" which is used in the antidegradation implementation policies integrates the goals of the State Plan into the Department's program to protect water resources.

Proposed N.J.A.C. 7:9B-1.5(d)4 describes the implementation of the antidegradation policies for new and/or expanded point source dischargers. New or expanded discharges must be consistent with the Water Quality Management Plan (WQMP) adopted pursuant to N.J.A.C. 7:15 for the area in which they are located. If the new or expanded discharge is inconsistent with the WQMP, the WQMP will need to be amended. As indicated at N.J.A.C. 7:9B-1.5(d)1vii, the antidegradation analysis may be evaluated during the water quality planning stage. Where the new or expanded discharge is consistent with the Water Quality Management Plan, the antidegradation evaluation will occur before the Department issues a draft NJPDES permit in accordance with N.J.A.C. 7:14A.

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Proposed N.J.A.C. 7:9B-1.5(d)4i, describes what is required as part of an antidegradation analysis. All applicants for new or expanded point source discharges will be required to perform an alternatives analysis to determine whether an alternative is available that will prevent a calculable change in water quality. The applicant will be expected to consider feasible modifications to existing and proposed systems, enhanced/alternative treatment technologies and relocation/connection to another treatment plant. If the Department agrees that there is no feasible alternative to the proposed surface water discharge the Department may require the applicant to initiate a water quality study as described in proposed N.J.A.C. 7:9B-1.5(d)4ii. The Department would not require a water quality study if the discharge results only in an increase in flow and not in calculable change in water quality such as a re-rating of an existing treatment plant.

The water quality study required at N.J.A.C. 7:9B-1.5(d)4ii is a study to determine the existing water quality of the receiving stream. Once the results of the study are submitted to the Department, the Department will use this information to determine water quality based effluent limitations for the discharge. Proposed N.J.A.C. 7:9B-1.5(d)4ii(1) and (2) describe how the Department will determine the scope of required water quality study. For an existing discharge, the Department will evaluate existing effluent data and current plant performance to determine which pollutants may result in a calculable change in water quality if the permittee is authorized to expand the discharge. Existing effluent data is not available for new discharges. Therefore, in accordance with proposed N.J.A.C. 7:9B-1.5(d)4ii(2), an applicant may evaluate effluent data from similar sized treatment plants utilizing similar treatment and water supply source. The Department will utilize the data evaluated by the applicant to establish effluent limits for the identified pollutants.

Proposed N.J.A.C. 7:9B-1.5(d)4iii describes the antidegradation standard for Category One waters. New or expanded discharges are in compliance with the antidegradation standard if the proposed action does not result in a calculable change in water quality.

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Proposed N.J.A.C. 7:9B-1.5(d)4iv, describes the antidegradation standard for Category Two waters. Similar to Category One waters, new or expanded discharges to Category Two waters throughout the State and Category Two waters within the Preservation Area of the Highlands Water Protection and Planning Act (N.J.S.A. 13:20-1 *et seq.*) comply with the antidegradation standard if the proposed action does not result in a calculable change in water quality.

The Department may allow a calculable change in water quality for certain projects that will impact a Category Two waterbody provided that the existing and designated uses of the waterbody are maintained and the project qualifies as a “necessary and justifiable social or economic development,” or where the cost to prevent the lowering of water quality would result in a "substantial economic impact." As indicated above, the Department has elected to use the State Plan to determine where a lowering in water quality should be allowed. The Department has added new definitions at N.J.A.C. 7:9B-1.4 to describe the types of projects that qualify as “necessary and justifiable social or economic development” and “substantial economic impact.” For example, a residential development in Planning Area 1, Planning Area 2, or a designated center would qualify as a “necessary and justifiable social or economic development.” For further discussion, see definition of “necessary and justifiable social or economic development.” Similarly a new or expanded public high school, regardless of location, would qualify as a "necessary and justifiable social or economic development" because it is a new or expanded public institution.

As indicated in the definition of "substantial economic impact," the Department will utilize the USEPA’s guidance (*Interim Economic Guidance for Water Quality Standards Workbook*. EPA-823-B-95-002 March 1995 available at <http://www.epa.gov/waterscience/econ>) for determining if an economic impact is substantial. The USEPA Guidance takes into account the cost of existing wastewater treatment as well as the construction costs and operating and management costs additional treatment necessary to prevent a lowering in water quality. If these costs exceed 2% of median household income per year, the costs to prevent a lowering in water quality would result in “substantial economic impact.” For example, if the project involves the

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expansion of a sewage treatment plant that services an affected community with a median household income of \$50,000 per year, the costs per household would need to exceed \$1,000 per year for the economic impact to be considered substantial. The costs must be shared among residential and industrial users. If the treatment plant services multiple communities, the analysis will be based on median income for the community with the lowest median household income. For privately-owned facilities, this evaluation considers other factors such as the facility's ability to secure financing and the degree to which it will be able to pass the costs of the pollution control on to its customers.

The Department will require applicants proposing projects that qualify as “necessary and justifiable social or economic development,” as well as those that demonstrate that the costs to prevent a calculable change in water quality would result in a “substantial economic impact,” to minimize the lowering of water quality. In accordance with proposed N.J.A.C. 7:9B-1.5(d)4iv(3)i-iv, the Department will establish water quality based effluent limits for the proposed new or expanded discharge that minimize the lowering of water quality based on the benefit to the public derived from the proposed project, the predicted in-stream water quality based upon a variety of treatment options, the cost associated with the various treatment options, and the environmental impacts associated with the various treatment options. Except as provided at N.J.A.C. 7:9B-1.9, which authorizes modification of water quality-based effluent limitations for individual dischargers to Category Two waters, the Department will not authorize a calculable change in water quality that would cause the in-stream concentrations to violate the Surface Water Quality Standards.

N.J.A.C. 7:9B-1.5(e)7 The Department is proposing to add a new provision at N.J.A.C. 7:9B-1.5(e)7 to indicate that the Department may require monitoring for mercury and PCBs using more sensitive analytical methods (method 1631 for mercury and 1668A for PCBs) for the purpose of characterizing the effluent. The Department is requiring the 40 C.F.R. 136 method for mercury as specified in the *Guidelines Establishing Test Procedures for the Analysis of Pollutants; Measurement of Mercury in Water; Revisions to EPA Method 1631*, (40 C.F.R. 136, Fed. Reg. 67:65876, October 29, 2002). A copy of this document is available at

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<http://www.epa.gov/waterscience/methods/1631.html>. This method allows measure mercury down to a level of 0.5 parts-per-trillion. This revision clarifies quality control and sample handling requirements and allows flexibility to incorporate additional available technologies. This rule also amends the requirements regarding preservation, storage, and holding time for low level mercury samples. For PCBs, the Department is recommending the 1668A method as specified in the *Method 1668, Revision A: Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by HRGC/HRMS*. EPA-821-R-00-002, December 1999) as amended. A copy of this document is available at <http://www.epa.gov/Region8/water/wastewater/biohome/biosolidsdown/methods/1668a5.pdf>.

This method was developed for congener-specific determination of the polychlorinated biphenyl (PCB). Revision A of Method 1668 has been expanded to include congener-specific determination of more than 150 chlorinated biphenyl (CB) congeners applicable to aqueous, solid, tissue, and multi-phase matrices.

Use of these more sensitive methods will allow the Department to develop a baseline to measure improvements and to develop future effluent limitations for these pollutants. The Department plans to require characterization with these new methods from facilities that it believes are likely sources of these pollutants. The Department will utilize facility information, short-term monitoring, information obtained from efforts in other states, and, for PCBs, information developed through the TMDL effort in the Delaware estuary to select the facilities that will be required to do characterization sampling. The characterization requirements may be adjusted based on information from the data submitted pursuant to this requirement.

As stated earlier in this summary, the lack of wildlife criteria for DDT and its metabolites, mercury, and PCBs was a concern to the USFWS. DDT and its metabolites, mercury, and PCBs are bioaccumulative pollutants that are persistent in the environment, accumulate in biological tissues, and biomagnify in the food chain. Due to these characteristics, the concentration of these contaminants may increase as they are transferred up through various food chain levels. As a result, adverse impacts to non-aquatic, piscivorous (fish-eating) organisms may arise from low surface water concentrations. An inter-agency committee

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(NJDEP, USEPA, and USFWS) was assembled to derive New Jersey-specific wildlife water quality criteria for mercury, PCBs, and DDT and its metabolites that would minimize the adverse effects of these pollutants on the bald eagle and peregrine falcon. (See *New Jersey-Specific Wildlife Values as Surface Water Quality Criteria for: PCBs, DDT, and mercury*. September 2001 available at <http://www.state.nj.us/dep/wmm/sgwqt/wildlifecriteria0901.pdf>).

In November 2002, the Department proposed New Jersey specific wildlife criteria for mercury, PCBs and DDT (see 34 N.J.R. 3889(a); November 18, 2002) to address the concerns raised by the USFSW in their 1996 Biological Opinion. The Department decided not to adopt the new criteria for these bioaccumulative substances due to issues raised during the comment period concerning the new more stringent criteria (for example, treatment techniques are not readily available to treat mercury to 0.5 ng/L). The Department published its decision not to adopt these criteria on February 17, 2004 in the New Jersey Register (36 N.J.R. 912(a)) and at that time committed to develop an implementation plan before it adopted the criteria.

To assist the Department in developing its implementation plan, USEPA Region 2 obtained contractor support to conduct an evaluation of the technical feasibility of wastewater treatment at NJPDES point sources to meet these very stringent criteria. Science Applications International Corporation (SAIC) concluded that treatment to meet the criteria proposed in 2002 is not readily available and that additional testing of available end-of-pipe treatment technologies is necessary to ensure that installation of a particular technology will achieve the proposed criteria. Pollution prevention was found to be a potentially more cost-effective strategy and could produce gains toward achieving standards without imposing the costs of unproven end-of-pipe technologies. These findings were published in a report entitled *Technological Feasibility of Proposed Water Quality Criteria for New Jersey*, dated March 2005 prepared for USEPA Region 2 by SAIC (EPA contract No. 68-C-99-252). A copy of this document can be found at <http://www.state.nj.us/dep/wmm/sgwqt/sgwqt.html>.

No states have addressed implementation of PCBs or DDT due to the lack of an approved analytical method capable of quantifying concentrations at the previously proposed criteria.

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However, many states have adopted implementation plans to reduce the levels of mercury in the environment. Several Great Lake States (Ohio, Minnesota, Wisconsin and Indiana) have adopted or are working to adopt state-wide variances for mercury. Others have addressed the problem with legislation. The Department is evaluating options for developing an implementation plan for mercury which could entail a state-wide variance for NJPDES point sources, a temporary standard or a TMDL. SAIC's report provides the Department with the information necessary to support a variance from the criteria based on an irretrievable man-induced condition. Other multimedia initiatives are under way that should lead to reductions in mercury concentrations in the State's waters.

Although limited data is available using the more sensitive methods, the results indicate that effluent concentrations exceed the current water quality standards for PCBs and mercury. The monitoring data obtained through N.J.A.C. 7:9B-1.5(e)7 will allow the Department to develop a baseline to measure improvements and to develop future effluent limitations as part of the overall implementation plan. This provision will allow the NJPDES program to require monitoring without having to impose WQBEL.

N.J.A.C. 7:9B-1.5(h)2i: The Department is proposing to move existing provisions regarding heat dissipation areas from N.J.A.C. 7:9B-1.14(c)11ii to N.J.A.C. 7:9B-1.5(h)2i. The Department is also proposing to repeal the phrase "as provided at N.J.A.C. 7:9B-1.14(c)11ii or variance issued pursuant to Section 316(a) of the Clean Water Act, 33 U.S.C. 1326(a)" from N.J.A.C. 7:9B-1.5(h)2i because the cross-reference to N.J.A.C. 7:9B-1.14(c)11 is no longer necessary. However, the reference to the Section 316(a) of the Clean Water Act is now recodified at N.J.A.C. 7:9B-1.5(h)2i(3).

N.J.A.C. 7:9B-1.6, Establishment of water quality-based effluent limitations, sets forth conditions and procedures to be used when developing WQBELs, including general applicability, necessary information, and methodologies. The Department is proposing the following changes to N.J.A.C. 7:9B-1.6.

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The Department is proposing to delete the word "measurable" from the provision at N.J.A.C. 7:9B-1.6(a) because it is now included in the definition of "calculable change." In addition, at N.J.A.C. 7:9B-1.6(c), the Department is proposing to replace the existing citation of N.J.A.C. 7:9B-1.14(c)14, with the correct citation N.J.A.C. 7:9B-1.14(f)7.

N.J.A.C. 7:9B-1.7, Waterway loadings in areawide water quality management plans, requires that any total maximum daily load, wasteload allocation, or load allocation established as an amendment to an areawide water quality management plan must be consistent with this chapter. The Department is proposing to readopt this section without change.

N.J.A.C. 7:9B-1.8, Procedures for modifying water quality-based effluent limitations for individual dischargers to Category One waters, sets forth the procedures to be followed by an applicant requesting a modification (usually referred to as a variance) of a WQBEL for a discharge into a Category One waterbody. Category One waters are to be protected from any calculable changes to the existing water quality through New Jersey's antidegradation policies N.J.A.C. 7:9B-1.5(d). The Department is proposing to readopt this section without change.

N.J.A.C. 7:9B-1.9, Procedures for modifying water quality-based effluent limitations for individual dischargers to Category Two waters, sets forth the procedures to be followed by an applicant requesting a modification of a WQBEL for a discharge into a Category Two waterbody. Through New Jersey's antidegradation policies at N.J.A.C. 7:9B-1.5(d), limited lowering of water quality may be permitted in high quality Category Two waters provided certain demonstrations are successfully made to the Department. The Department is proposing to readopt this section without change.

N.J.A.C. 7:9B-1.10, Procedures for reclassifying specific segments for less restrictive uses, sets forth specific requirements necessary to petition the Department to remove a designated use from a waterbody. The Department is proposing to readopt this section without change.

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N.J.A.C. 7:9B-1.11, Procedures for reclassifying specific segments for more restrictive uses, sets forth specific requirements for petitioning the Department to add a designated use to a waterbody. The Department is proposing to readopt this section without change.

N.J.A.C. 7:9B-1.12, Designated uses of FW1, PL, FW2, SE1, SE2, SE3, and SC waters, lists the designated uses of the different surface water classifications of New Jersey. FW1 waters are pristine freshwaters that have been set aside by the Department to represent the natural aquatic environment and its associated biota. PL waters are those waters contained within the boundaries of the Pinelands area. FW2 waters are the remaining freshwaters in the State that are not classified as FW1 or PL. SE1, SE2, and SE3 waters are saline estuarine waters and SC waters are saline coastal waters. The Department is proposing to readopt this section without change.

N.J.A.C. 7:9B-1.13, Designated uses of mainstem Delaware River and Delaware Bay, states that the designated uses of the Delaware River and Bay are as set forth in the Delaware River Basin Commission (DRBC) regulations (Delaware River Basin Commission, Administrative Manual - Part III, Water Quality Regulations" Article 3, October 23, 1996, as amended). The Department is proposing to readopt this section without change.

N.J.A.C. 7:9B-1.14, Surface water quality criteria, contains the surface water criteria (either narrative statements or numerical values) for waters classified as FW1, PL, FW2, SE and SC. The surface water criteria for the Delaware River and Bay are as contained in the DRBC regulations.

There are currently three sets of surface water quality criteria that are applicable to New Jersey waters:

- (1) Criteria contained at N.J.A.C. 7:9B;
- (2) Criteria adopted by the USEPA for New Jersey waters (40 CFR 131.36) see Water Quality Standards; *Establishment of Numeric Criteria for Priority Toxic Pollutants*;

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States' Compliance. Final Rule. 57 Fed. Reg. 60911, December 22, 1992, Water Quality Standards; *Establishment of Numeric Criteria for Priority Toxic Pollutants, States' Compliance-Revision of Metals Criteria*. Interim Final Rule. 60 Fed. Reg. 22229, May 4, 1995 National Toxics Rule, and 60 Fed. Reg. 44120, August 24, 1995) together referred to as the National Toxics Rule (NTR); Water Quality Standards; *Establishment of Numeric Criteria for Priority Toxic Pollutants, States' Compliance-Revision of Polychlorinated Biphenyls (PCBs) Criteria*; Final Rule 64 Fed. Reg. 61182, November 9, 1999; (all the above referenced Federal Registers can be found at <http://www.epa.gov/fedrgstr/EPA-WATER>) and

- (3) Criteria promulgated by the DRBC (Delaware River Basin Commission, Administrative Manual - Part III, Water Quality Regulations," Article 3, dated October 23, 1996, <http://www.state.nj.us/drbc>).

In developing water quality based effluent limitations (WQBEL) for NJPDES permits, the Department evaluates these three sets of criteria to determine which criteria govern. In some circumstances, a discharge permit may contain limitations based on a combination of the DRBC criteria, State promulgated criteria and/or the applicable NTR criteria. In such cases, the Department applies the more stringent of the applicable criteria.

For the pollutants that have criteria governed under NTR, New Jersey cannot issue modifications to WQBELs pursuant to N.J.A.C. 7:9B-1.8 and 1.9 or approve site-specific criteria. In order to administer the NJPDES program more efficiently, the Department is proposing criteria for several pollutants to replace the NTR criteria still applicable to New Jersey waters.

The Department is proposing to repeal N.J.A.C. 7:9B-1.14(c) and recodify the same at N.J.A.C. 7:9B-1.14(c) through (g). In addition to proposing updated criteria at N.J.A.C. 7:9B-1.14 which will be discussed in detail below, the Department is proposing to amend the format for presentation of the criteria at N.J.A.C. 7:9B-1.14 as follows:

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N.J.A.C. 7:9B-1.14(b)2ii The Department is proposing to amend N.J.A.C. 7:9B-1.14(b)2 so that bacterial quality criteria proposed at N.J.A.C. 7:9B-1.14(d) apply to Pinelands waters instead of the surface water quality criteria adopted in March 1981. The Department believes it is appropriate to apply the E. coli and enterococcus criteria to PL waters, as well as to fresh and saline waters. The proposed changes regarding E. coli and enterococci criteria are discussed below.

N.J.A.C. 7:9B-1.14(c) The Department is proposing a new section (c) that indicates that unless site-specific criteria are established at proposed N.J.A.C. 7:9B-1.14(g), the State-wide criteria apply pursuant to proposed N.J.A.C. 7:9B-1.14(d) through (f).

N.J.A.C. 7:9B-1.14(d) The Department is amending criteria for bacterial quality and temperature at N.J.A.C. 7:9B-1.14(c) and recodifying the same at N.J.A.C. 7:9B-1.14(d) as explained below.

N.J.A.C. 7:9B-1.14(d)1 The Department is proposing to retain the bacterial indicators criteria for shellfish waters at proposed N.J.A.C. 7:9B-1.14(d)1i. The Department is proposing to amend and recodify the remaining criteria for bacterial indicators at N.J.A.C. 7:9B-1.14(d)1ii through iii based on new scientific information and the USEPA's recently adopted amendments to 40 CFR 131 for Coastal and Great Lakes Recreation Waters (*Water Quality Standards for Coastal and Great Lakes Recreation Waters*; Final rule. 69 Fed. Reg. 67218, November 16, 2004 found at <http://www.epa.gov/fedrgstr/EPA-WATER>).

Fecal coliform criteria:

The Department is proposing to repeal the fecal coliform criteria for FW2, SE1 and SC waters. These waters are designated for primary contact recreation. The Department has determined that it is appropriate to replace the fecal coliform criteria for primary contact recreation waters with enterococci and E. coli criteria. Therefore, the Department is proposing to enterococci and E. coli criteria at proposed N.J.A.C. 7:9B-1.14(c)1ii(1) and (2) respectively.

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Historically, fecal coliform had been the preferred indicator of fecal matter in ambient water by the USEPA and the Department. However, USEPA no longer supports the use of fecal coliform as a reliable indicator of human illness risk from primary contact recreation. The USEPA now recommends the use of *E. coli* and enterococcus as pathogen indicators for fresh waters and enterococcus for marine waters (USEPA's draft *Implementation Guidance for Ambient Water Quality Criteria for Bacteria*. November 2003). Therefore, the Department is proposing to replace the existing fecal coliform criteria for those waters designated for primary contact recreation (FW2, SE1 and SC classifications) at N.J.A.C. 7:9B-1.14(c)1ii(1) and (2) with enterococcus (SE1 and SC waters) and *E. coli* indicators (FW2 waters), respectively.

The SE2 and SE3 stream classifications are not designated for primary contact recreation. The USEPA does not recommend criteria for secondary contact recreation in *Water Quality Criteria for Bacteria 1986* (EPA 440/5-84-002) which can be found at <http://www.epa.gov/waterscience/criteria/>. Therefore, the Department is retaining the criteria adopted in 1971 (3 N.J.R. 149; August 5, 1971(b)) and to moving the existing fecal coliform criteria for SE2 and SE3 waters from N.J.A.C. 7:9B-1.14(c)1ii(3) and (4) to proposed N.J.A.C. 7:9B-1.14(d)1iii(1) and (2). In New Jersey, most of the waters designated as SE2 and SE3 are located in the NY/NJ harbor area and many waters are shared with New York. The Department is retaining the fecal coliform criteria for secondary contact recreation in these waters while working with the USEPA and New York Department of Environmental Conservation to develop consistent designated uses and SWQS for the shared waters.

E. coli in FW2 waters:

The Department is proposing to repeal the water quality criteria for enterococcus in FW2 waters at existing N.J.A.C. 7:9B-1.14(c)iii(1), and to add criteria for *E. coli* for these waters at proposed N.J.A.C. 7:9B-1.14(d)ii(2). The USEPA's *Water Quality Criteria for Bacteria 1986* (EPA 440/5-84-002) which can be found at <http://www.epa.gov/waterscience/criteria/> specifies that enterococcus and *E. coli* are equally valid as indicators of health risk in fresh bathing waters. The USEPA 1986 criteria are based on prospective epidemiological studies conducted in the late 1970s and early 1980s at Keystone Lake in Oklahoma and Lake Erie in Pennsylvania. These

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studies showed that the correlation of the bacterial indicator concentration to the rate of highly credible gastrointestinal illness was 0.74 for enterococcus and 0.80 for E. coli and was further supported in the 1984 USEPA study, *Health Effects Criteria for Fresh Recreational Waters*. EPA-600/1-84-004 (<http://www.epa.gov/waterscience/criteria>). These correlations are both strong, but not statistically different from one another. Fecal coliform bacteria, the only other indicator monitored, showed no correlation with bather illness. To date, this is the only known fresh water bathing beach epidemiological study conducted in the United States monitoring E. coli in addition to the other two indicators (enterococcus and fecal coliform bacteria).

There have been additional bathing beach epidemiological studies conducted in other countries that have also employed E. coli. The Centers for Disease Control and Prevention funded a study that compared the results of the U.S. study with the results of the studies conducted in other countries, based on E. coli, enterococcus, as well as other indicators. The results of this analysis showed that, overall, E. coli was a more consistent predictor of gastrointestinal illness than enterococcus or other bacterial indicators (Wade, T.J., N. Pai, J.N.S. Eisenberg, and J.M. Colford, Jr. 2003. *Does U.S. Environmental Protection Agency water quality guidelines for recreational waters prevent gastrointestinal illness? A systematic review and meta-analysis*. Environ. Sci. Technol. 111 (8): 1102 - 1108). E. coli comprises most of the fecal coliform group of bacteria. New Jersey should be able to evaluate statistical trends using historical fecal coliform data and new data based on E. coli.

Currently the USEPA allows the use of E. coli or enterococcus as indicators when monitoring the sanitary quality of freshwater recreational beaches (*Water Quality Standards for Coastal and Great Lakes Recreation Waters*. Final rule, 69 Fed. Reg. 67218, November 16, 2004 found at <http://www.epa.gov/fedrgstr/EPA-WATER>). Based on the available updated information, the Department is proposing E. coli at N.J.A.C. 7:9B-1.14(d)ii(3) as the pathogen indicator in freshwater. The USEPA identified a choice of four single sample maximum values with different risk levels in the USEPA's *Water Quality Criteria for Bacteria 1986* (EPA 440/5-84-002) which can be found at <http://www.epa.gov/waterscience/criteria/>. Based on USEPA's recommendation, the Department is proposing that levels shall not exceed a geometric mean of

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126/100 ml for FW2 waters. Where there is insufficient data to calculate a geometric mean in FW2 waters, a single sample maximum (SSM) of 235/100 ml for E. coli is to be used to identify waters for additional monitoring. The associated risk level for E. coli is as protective as the existing risk level that is in place for the enterococci criteria.

Enterococcus in SE1 and SC Waters:

The USEPA exclusively recommends the use of enterococcus in marine waters as specified in the *Water Quality Standards for Coastal and Great Lakes Recreational Waters*; Final rule. 69 Fed. Reg. 67218, November 16, 2004 found at <http://www.epa.gov/fedrgstr/EPA-WATER>. The Department is, therefore, retaining enterococcus as the indicator organism for all SE1 and SC waters and recodifying this requirement from existing N.J.A.C. 7:9B-1.14(c)1iii(2) to proposed N.J.A.C. 7:9B-1.14(d)1ii(1). However, the Department is changing the policy regarding implementation of criteria as explained in the summary at N.J.A.C. 7:9B-1.5(c)7.

USEPA requires water quality criteria for bacteria in coastal recreation waters to be as protective of human health as criteria listed at *Ambient Water Quality Criteria for Bacteria-1986*. (EPA 440/5-84-002) which can be found at <http://www.epa.gov/waterscience/criteria/>. In addition, USEPA requires that the SSM value for the designated coastal bathing beach areas be the most protective of the four possible choices pursuant to the *Water Quality Standards for Coastal and Great Lakes Recreation Waters*; Final rule. (69 Fed. Reg. 67218, November 16, 2004 found at <http://www.epa.gov/fedrgstr/EPA-WATER>). Coastal designated bathing beaches, as defined in 40 CFR 131.41(b)(2), are regulated pursuant to New Jersey State Sanitary Code at N.J.A.C. 8:26. Coastal designated bathing beaches include those beaches located in SE1 and SC waters that are heavily used for primary contact recreation during the recreational season and have received approval for public recreational use. The Department is retaining the proposed N.J.A.C. 7:9B-1.5(c)7 indicating that SSM of 104/100ml to be used for the opening and closing of designated beaches in the coastal back bays (SE1) and along the coast (SC) where there is a high intensity recreational use.

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The Department is proposing to amend and recodify the existing provision at N.J.A.C. 7:9B-1.14(c)1iv regarding sampling methods for bacterial quality to propose N.J.A.C. 7:9B-1.5(c)7. As part of this revision, the Department is proposing to delete that part of the provision which identifies the sampling methods, frequency, and locations for bacterial indicators because sampling methods and locations are not part of criteria. The frequency and locations for monitoring depends on the purpose of the sampling. For example, bathing beach monitoring requirements are specified at N.J.A.C. 8:26, for shellfish waters these requirements are established by the National Shellfish Sanitation Program, and pursuant N.J.A.C. 7:14A-13.16, these requirements are specified in individual NJPDES permits. In addition, for ambient monitoring, quality assurance project plans identify the sampling frequencies and locations to allow the Department to assess water quality and compliance with the water quality criteria.

Pathogen Indicators in NJPDES Permits: In accordance with N.J.A.C. 7:14A-6.5(b)2ii, the Department will continue to evaluate NJPDES permit compliance using fecal coliform. Since USEPA requires permittees to use NPDES approved methods for analyzing wastewater. However, a NPDES approved method has not been promulgated for enterococcus or E. coli in wastewater effluent limitations must be based on fecal coliform. Therefore, the Department will not impose limits in NJPDES permits based on enterococcus or E. coli until NPDES methods are approved by the USEPA.

N.J.A.C. 7:9B-1.14(d)11 The Department is proposing a maximum temperature criterion of 20°C for trout production waters for the first time similar to the existing criterion for trout maintenance waters. The Department is not proposing changes to maximum temperature criteria applicable to other stream classification except by recodifying temperature criteria are recodified at proposed N.J.A.C. 7:9B-1.14(c)11i through v. Other provisions regarding temperature deviations and heat dissipation areas are recodified at proposed N.J.A.C. 7:9B-1.5(c)8 and N.J.A.C. 7:9B-1.5(h)2i(1)-(3) respectively, to clarify the implementation of temperature criteria.

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The proposed temperature criteria for trout production waters and the existing temperature criteria for trout maintenance waters at N.J.A.C. 7:9B-1.14(d)11 are optimum temperatures for feeding, general activity, growth and reproduction. Temperatures greater than 20°C can stress trout. According to USEPA *Quality Criteria for Water: 1986* EPA 440/5-85-001EPA which can be found at <http://www.epa.gov/waterscience/criteria/>, the short-term lethal threshold for brook trout and rainbow trout is 24°C. Therefore, it is possible for a stream to support trout with temperatures greater than 20°C for short periods of time if the stream provides opportunity for the fish to seek cooler stream temperatures. Additionally, sudden increases or decreases in stream temperatures can also be lethal.

Water temperatures influence growth, reproduction, feeding, and behavior of fish and other aquatic life. Natural temperatures of a waterbody fluctuate daily and seasonally. Riparian vegetation plays a critical role in maintaining stream temperatures during the summer season. However, as a stream widens, the ability of streamside vegetation to mitigate temperature impacts decreases. Water withdrawals, dams (both manmade and beavers), and heated discharges may cause unacceptable increases in stream temperatures.

As indicated above, measured stream temperatures over 20°C do not necessarily mean that the trout production/maintenance use is impaired. The Department believes that it is necessary to evaluate stream temperature over a period of time during the summer rather than an occasional grab sample collected during the afternoon when the ambient temperature is at maximum. More extensive sampling allows better assessment of the magnitude and duration above the optimum temperature of 20°C. Therefore, the Department plans to revise its assessment methodology used to identify waterbodies that are impaired. Based on the revised assessment methodology, the Department will identify waterbodies that do not meet the aquatic life use due to temperature and schedule these waterbodies for TMDL development. The Department believes that a TMDL is the best approach to identify cost-effective actions needed to restore temperature. Actions to restore temperature through a TMDL could result in changes to the operations of water supply reservoirs, restoration of a more natural riparian corridor, elimination of beaver dams, and improvements in stormwater management.

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Once a waterbody has been listed as impaired for temperature on Sublist 5 of the Integrated List (303(d) list), NJPDES dischargers to that waterbody may be required to conduct instream temperature monitoring upstream and downstream of their discharge. The stream temperature data collected by NJPDES dischargers will be used by the Department to determine if a discharge increases the ambient stream temperature by more than the acceptable levels established at N.J.A.C. 7:9-1.5(c)8 and to establish wasteload allocations, if appropriate. For existing dischargers, the Department does not believe there is a need to require NJPDES facilities, except those that discharge cooling water, to install equipment to reduce effluent temperature. Requirements for an affected NJPDES discharger are best implemented through a TMDL where BMPs and other cost effective alternatives can be utilized to maintain temperature that is protective of the existing trout use.

New and expanding point sources are subject to the antidegradation provisions at N.J.A.C. 7:9B-1.5(d). As part of the overall antidegradation review, the Department will determine whether the proposed discharge would cause an increase in the ambient stream temperature outside the heat dissipation area more than allowed at N.J.A.C. 7:9B-1.5(c)8.

N.J.A.C. 7:9B-1.14(d)13 The Department is moving turbidity criteria, currently codified at N.J.A.C. 7:9B-1.14(c)14 to proposed N.J.A.C. 7:9B-1.14(d)13. However, no change is proposed to the turbidity criteria.

N.J.A.C. 7:9B-1.14(e) The Department is proposing to recodify ammonia criteria currently at N.J.A.C. 7:9B-1.14(c)13vi to proposed N.J.A.C. 7:9B-1.14(e). The design flows and the averaging periods applicable to ammonia criteria are being incorporated into this section. No changes are proposed to the criteria, except that the Department is proposing to delete the criteria applicable to Pinelands waters with levels of pH equal to or greater than 8.3. The levels of pH in Pinelands waters range from 3.5 to 5.5. Therefore, a criterion applicable to greater than a pH of 8.3 is unnecessary.

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N.J.A.C. 7:9B-1.14(f) The Department is proposing to recodify the toxic substance criteria at existing N.J.A.C. 7:9B-1.14(c)13 to N.J.A.C. 7:9B-1.14(f). Surface water quality criteria established for toxic pollutants are to protect aquatic life and human health in both fresh and saline waters. Aquatic life-based criteria are set to protect aquatic organisms from both acute and chronic effects. Human health-based freshwater criteria are designed to protect people from adverse effects due to water intake and fish consumption. Human health-based criteria for saline waters are designed to protect people from adverse effects due to fish consumption only. In addition, for carcinogenic-based pollutants, the criteria are developed which would result in no greater than a one-in-one-million lifetime excess cancer risk. For non-carcinogens, the criteria are developed based on non-carcinogenic effects which would result in no appreciable risk of deleterious effect. The development of aquatic life protection criteria and human health protection criteria are discussed below.

Aquatic life protection criteria: As part of this rulemaking, the Department is proposing aquatic criteria for metals (arsenic, cadmium, chromium III, chromium VI, copper, mercury, nickel, selenium, silver, and zinc) and updating freshwater criteria for gamma BHC, dieldrin, endrin, and pentachlorophenol at N.J.A.C. 7:9B-1.14(f). The Department is revising these criteria based on the USEPA 2005 national recommendations pursuant to Section 304(a) of the CWA. In May 2005, the USEPA published *National Recommended Water Quality Criteria Table: Poster and Brochure* (NRWQC 2005) to reflect the compilation of the updated information already published in 2002 for aquatic life and human health protection criteria and 2003 for human health criteria for selected toxic priority pollutants. All these publications can be found at <http://www.epa.gov/waterscience/criteria/>. These proposed criteria are shown in Table 3 below. With the exception of saltwater criteria for nickel and freshwater criteria for selenium (See discussion on nickel and selenium below), the Department is proposing the USEPA NRWQC 2005 criteria for New Jersey. The Department is retaining the existing aquatic criteria for other pollutants listed at N.J.A.C. 7:9B-1.14(f) (aldrin, ammonia, saline criteria for gamma-BHC, chlordane, chloride, chlorine produced oxidants, chlorpyrifos, cyanide, 4,4'-DDT, demeton, saline criteria for dieldrin, endosulfans, saline criteria for endrin, guthion, heptachlor, heptachlor epoxide, malathion, methoxychlor, mirex, parathion, saline criteria for

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pentachlorophenol, phosphorus, PCBs, sulfide-hydrogen sulfide, and toxaphene). However, because the Department is proposing to change the presentation style of the criteria tables at N.J.A.C. 7:9B-1.14(c) through (g), all the tables and the criteria have been amended. Except as noted above, the aquatic criteria are being readopted without change.

The 1987 amendments to section 303(c)(2)(B) of the CWA required all states to adopt toxics criteria for priority pollutants. The states were provided five years to incorporate the toxics criteria into their water quality standards. New Jersey did not adopt toxics criteria into their surface water quality standards within the given time frame. As a result the USEPA adopted criteria for New Jersey as part of the National Toxics Rule (NTR) Water Quality Standards; *Establishment of Numeric Criteria for Priority Toxic Pollutants; States' Compliance*. Final Rule. 57 Fed. Reg. 60911, December 22, 1992 (<http://www.epa.gov/fedrgstr/EPA-WATER>).

New Jersey is currently under the NTR for freshwater and saline aquatic life protection criteria for the following metals: arsenic, cadmium, chromium III, chromium VI, copper, mercury, nickel, selenium, silver, and zinc. The NTR aquatic life-based metals criteria were based on the 1985 *Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses* (1985 Guidelines). EPA 440/5-84-031 found at <http://www.epa.gov/waterscience/criteria/>. In 1995 the USEPA updated the aquatic life-based freshwater criteria for several pollutants as part of the Great Lakes Initiative (1995 Updates) (*1995 Updates: Water Quality Criteria Documents for the Protection of Aquatic Life in Ambient Water*). EPA-820-B-96-001. The 1995 methodology added recent toxicity data and removed the use of a final residue value in deriving a chronic criterion. In 2005, the USEPA published an updated 304(a) criteria list recommending the most updated values available for each pollutant under the *National Recommended Water Quality Criteria Table: Poster and Brochure* found at <http://www.epa.gov/waterscience/criteria/>, as national water quality criteria recommendations. The proposed criteria include a combination of criteria developed as part of the 1985 Guidelines and the 1995 Updates.

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Criteria Development: Aquatic life protection criteria are estimates of the highest concentration of a pollutant that may be present in water while maintaining the protection of aquatic life from acute and chronic effects. Aquatic criteria are developed using the USEPA methodology from the *Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses* (USEPA, 1985) found at <http://www.epa.gov/waterscience/criteria/> for most of the proposed saltwater criteria. The proposed freshwater criteria are developed based on the *1995 Updates: Water Quality Criteria Documents for the Protection of Aquatic Life in Ambient Water* (EPA-820-B-96-001) (1995 Updates). The 1995 Updates document was developed as a supporting document for the *Water Quality Standards; Establishment of Numeric Criteria for Priority Toxic Pollutants for the State of California; Proposed Rule*. 62 Fed. Reg. 42160 found at <http://www.epa.gov/fedrgstr/EPA-WATER>. The chemical specific criteria derivation explained below identifies the methodology used in each case.

Following is a general methodology to calculate an acute or a chronic criterion. This methodology is common between the two methods mentioned above (the 1985 Guidelines and the 1995 Updates). The change between the two methods is explained in the final chronic value derivation below.

Toxicity data representing the following aquatic families are used to derive an acute or a chronic value:

Freshwater

1. A species representing the family Salmonidae from the class Osteichthyes;
2. A species representing a commercially or recreationally important warm water habitat, in the class Osteichthyes;
3. A species representing a family from the phylum Chordata;
4. A species representing a planktonic crustacian;
5. A species representing a benthic crustacian;
6. A species representing an insect;

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7. A species representing a family from a phylum other than Arthropoda or Chordata; and
 8. a species representing a family in any order of insect or any phylum not already represented.

Saltwater

1. Two species, each representing different families in the phylum Chordata;
2. A species representing a family from a phylum other than Arthropoda or Chordata;
3. A species representing either a Mysidae or Penaeidae family;
4. Three species representing families other than Chordata with possible inclusion of either Mysidae or a Penaeidae whichever was not already used; and
5. A species representing any other family.

Using the available toxicity information, a geometric mean is calculated for each species as species mean acute value (SMAV). A geometric mean of all the available SMAVs for a genus is calculated as genus mean acute values (GMAV) and ranked from highest to lowest. A final acute value (FAV) is calculated from the lowest four GMAVs following the derivation outlined in the Guidelines (USEPA, 1985) and as shown below. Dividing the FAV with two derives a criterion maximum concentration (CMC) or the acute criterion. The criteria may be further refined if a SMAV from flow-through tests for a commercially or recreationally important species is lower than the calculated FAV, then that SMAV is used as the FAV.

$$S^2 = \frac{\Sigma((\ln \text{GMAV})^2) - ((\Sigma(\ln \text{GMAV}))^2) / 4}{\Sigma (P) - ((\Sigma(\sqrt{P}))^2) / 4}$$

$$L = (\Sigma(\ln \text{GMAV}) - S(\Sigma(\sqrt{P}))) / 4$$

$$A = S(\sqrt{0.05}) + L$$

$$\text{FAV} = e^A$$

$$\text{CMC} = \text{FAV} / 2$$

where:

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S = slope

P = cumulative probability

L = intercept

A = log of FAV

When data are available to show that acute toxicity to two or more species is dependent on a water quality characteristic such as hardness, then that relationship is taken into consideration (USEPA, 1985). For each species, a least squares regression of the acute toxicity values on the corresponding values of the water quality characteristic is performed to obtain a slope. All the acceptable data from different species showing a similar correlation are used and the data are normalized. All the normalized data are treated as one species and a least squares regression of the toxicity data to the corresponding water quality characteristic is completed to obtain a pooled slope.

Using the pooled slope, each toxicity value is adjusted to a selected value of water quality characteristic (for example, a hardness level of 50 mg/L CaCO₃). The adjusted toxicity values are grouped into GMAVs and a FAV is calculated at a given water quality characteristic using the following equation:

$$\text{Final acute equation} = e^{(V[\ln (\text{water quality characteristic})] + \ln A - V[\ln Z])}$$

where:

V = pooled slope

A = FAV at Z

Z = selected value of water quality characteristic

A final chronic value (FCV) can be calculated in a similar manner to FAV if chronic toxicity data are available on eight different species listed above for both fresh and saline water. A final chronic value can also be calculated by utilizing an acute chronic ratio (ACR) method if acceptable acute and chronic toxicity data are available for at least a freshwater invertebrate, a fish, and an acutely sensitive saline species or vice versa. A FCV can be calculated using the following formula:

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$$FCV = FAV / ACR$$

If a species mean chronic value or SMCV from flow-through tests for a commercially or recreationally important species is lower than the calculated FCV, then that SMCV is used as the FCV to protect the more sensitive species.

When data are available to show that chronic toxicity to two or more species is dependent on a water quality characteristic; the same derivation as explained above for the acute criterion equation is followed to derive a chronic criterion equation. However, if insufficient data are available to adequately define the relationship between chronic toxicity and the water quality characteristic, USEPA determined that it is appropriate to assume that the chronic slope is the same as the acute slope. Using the chronic pooled slope, all acceptable chronic toxicity data are adjusted to a selected value of water quality characteristic and a chronic criterion equation is derived in the same way as the acute criterion equation.

According to the 1985 Guidelines, the calculated chronic value is compared with any available plant value and residue value and the most stringent of the three values is used as the criterion continuous concentration (CCC) or a chronic criterion. However, the 1995 Updates did not use the residue value because the bioaccumulation of pollutants was handled through the derivation of wildlife criteria and human health criteria.

Conversion Factors: The USEPA initially expressed aquatic metals criteria as total recoverable criteria and promulgated the criteria as such in the NTR. After the establishment of the NTR, a central issue in establishing and implementing metals criteria and how to accurately determine the fraction of the total metal that is biologically available was raised and discussed by the interested parties and the USEPA. In 1995, the USEPA decided that the dissolved portion of the metal more closely approximates the bioavailable fraction of the metal in the water column than does total recoverable metal. The USEPA, therefore, recommended conversion factors to convert the total recoverable metals into dissolved metals as part of the *Establishment of Numeric Criteria for Priority Pollutants; States Compliance-Revisions of Metals Criteria*. (60 Fed. Reg. 22229, May 4, 1995) (<http://www.epa.gov/fedrgstr/EPA-WATER>). These conversion

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factors were calculated inconsistently using toxicity tests at varying lengths of exposure time that were averaged more than once in the process of conversion factor derivation. To correct the inconsistency in the USEPA method of calculating the conversion factors, Dr. Thomas Fikslin, Delaware River Basin Commission (DRBC), recalculated the conversion factors for cadmium, chromium III, chromium VI, copper, nickel, and zinc using time weighted averages that provided equal time weighting over the test duration. The DRBC conversion factors were published in the *Revised Procedure for Converting Total Recoverable Water Quality Criteria for Metals to Dissolved Criteria*. 1995, DRBC (<http://www.state.nj.us/drbc>). The USEPA evaluated the DRBC conversion factors and determined that these factors represent a different, reasonable interpretation of the data that will result in water quality criteria that adequately protect aquatic life. (Letter dated March 4, 1998 from Jeanette Wiltse, Director of Health and Ecological Criteria to Vincent P. D'Anna, Federal Commissioner, DRBC).

The proposed freshwater acute and chronic criteria for total recoverable metals (cadmium, chromium III, chromium VI, copper, nickel, and zinc) have been converted to dissolved using the DRBC recalculated and USEPA approved conversion factors as listed at proposed N.J.A.C. 7:9B-1.14(f)3. To convert the proposed total recoverable metals criteria for arsenic, mercury, selenium, and silver to dissolved criteria, the Department is using the conversion factors developed by the USEPA. To convert the proposed saltwater acute and chronic total recoverable criteria into dissolved criteria, the Department is using the USEPA saltwater conversion factors. The DRBC and USEPA conversion factors are listed in Table 1 below.

Table 1. Conversion Factors

Chemical	Freshwater		Saltwater	
	Acute	Chronic	Acute	Chronic
Arsenic	1.0	1.0	1.0	1.0
Cadmium	0.651+	0.651+	0.994	0.994
Chromium III	0.277+	0.277+	N/A	N/A
Chromium VI	0.919+	0.919+	0.993	0.993
Copper	0.908+	0.908+	0.83	0.83
Mercury	0.85	0.85	0.85	0.85

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Nickel	0.846+	0.846+	0.990	0.990
Selenium	0.996*	0.992*	0.998	0.998
Silver	0.85	N/A	0.85	N/A
Zinc	0.950+	0.950+	0.946	0.946

+ DRBC recalculated conversion factors

* National Recommended Water Quality Criteria 2002. (EPA 822-R-02-047)

N/A Not applicable

Water Effect Ratio: The USEPA 304(a) recommended aquatic life protection criteria equations for metals include a Water Effect Ratio (WER). A WER is a criterion adjustment factor accounting for the effect of site-specific water characteristics on pollutant bioavailability and toxicity to aquatic life. A WER also accounts for a difference between the toxicity of the metal in laboratory dilution water and its toxicity in the water at the site. The USEPA recommends a default WER of 1 for all aquatic life protection metals criteria. The USEPA also published Interim Guidance on Determination and Use of Water-Effect Ratios for Metals in 1994 (EPA-823-B-94-001) found at <http://www.epa.gov/waterscience/criteria/>. The Department has reviewed the USEPA recommended procedures for developing site-specific WERs. The protocol requires the facility to conduct toxicity studies comparing simulated receiving water (a mix of effluent and stream water reflecting the effluent dilution at design low flow conditions) to laboratory water toxicity tests. Most NJPDES dischargers are unable to use site (stream) water for their existing Whole Effluent Toxicity (WET) testing due to other sources of toxicity in the stream, therefore, it is unlikely that these studies would be successful. Additionally, concerns have been raised that a measured WER does not accurately reflect actual instream toxicity. Factors that could affect the measured bioavailability include alkalinity, pH, interaction of multiple metals, and other toxic substances. As a result, the toxicity reflected by a WER may not be protective of the aquatic biota. A method for addressing some of these concerns (Biotic Ligand Method) is under development by the USEPA with the expectation that the Biotic Ligand Method will replace the use of WERs to reflect instream toxicity of metals. For these reasons the Department has decided to not entertain requests to conduct site specific WER studies and will use the USEPA recommended default of 1.0 in calculating applicable aquatic life protection criteria for metals.

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Using the equations at N.J.A.C. 7:9B-1.14(f)3, criteria can be calculated at any hardness for cadmium, chromium III, copper, nickel, silver, and zinc.

Aquatic Averaging Periods: At proposed N.J.A.C. 7:9B-1.14(f)1 and 2, the Department is proposing averaging periods applicable to different pollutants and criteria. A 1-hour acute averaging period is proposed for all acute criteria, except for some metals as explained below. A 4-day chronic averaging period is proposed for all chronic criteria.

An averaging period is the duration or period of time over which the ambient concentration is averaged for comparison with criteria concentrations. Averaging periods play a major role in the development of Water Quality Based Effluent Limits (WQBEL). WQBELs are derived based on several factors: the volume of wastewater discharged, the upstream concentration of the pollutant, the applicable design flow of the receiving waterbody specified at N.J.A.C. 7:9B-1.5(c)2, the appropriate water quality criterion (acute, chronic, or human health criterion) and the applicable averaging periods. The WQBELs are calculated for all applicable criteria and the most stringent limit is imposed. This ensures that the discharge does not cause a violation of the water quality criteria.

Averaging periods are kept relatively short (one hour for acute and 4 days for chronic) because excursions higher than the average can kill or cause substantial damage to aquatic life in short periods. The USEPA has historically established the acute averaging period for toxic pollutants as one hour in its Section 304(a) criteria documents. This reflects a conservative regulatory approach to toxic pollutants, which considers all toxic pollutants as "fast-acting." At N.J.A.C. 7:9B-1.14(f)1 the Department is proposing a 1-hour acute averaging period for all the proposed acute criteria, except for cadmium, chromium, copper, lead, mercury, nickel, silver, and zinc. For the reasons explained below, the proposed acute averaging period is six-hours for cadmium, chromium, lead, mercury, nickel, silver, and zinc and 24-hours for copper. The Department is also proposing a 4-day chronic averaging period at N.J.A.C. 7:9B-1.14(f)2 for all the proposed chronic criteria. This reflects no change from the existing averaging periods for chronic criteria.

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In 1996 the Department conducted research to find out if alternative acute averaging periods would be acceptable. Discussions between the USEPA and the Department revealed that the USEPA had initiated a reevaluation of the exposure/averaging periods for metals. This reevaluation was carried out under the oversight of the USEPA's Aquatic Life Criteria Guidelines Committee by Abt Associates, Inc., and completed in December 1994. On April 10, 1995 the Department sent a letter to Margaret Stasikowski, Director, Health and Ecological Criteria Division of the USEPA to ask for a copy of the completed reevaluation. In response, copies of memoranda (dated July 19, 1994, November 7, 1994 and December 19, 1994) from Abt Associates, Inc. to Charles Delos, USEPA Health and Ecological Criteria Division were provided with a short cover memo, dated May 18, 1995 from Margaret Stasikowski, listing the materials being sent, stating that the results had been summarized in Tables 1 and 2, and stating that "the consensus has been that an appropriate averaging period could be set at the inverse of the kinetic coefficient" (constant) used to relate toxic concentrations to exposure times. The memoranda from Abt Associates, Inc. indicated that they worked with small datasets (sometimes only 2), and the tests used were limited to those used to calculate the 304(a) criteria (Table 1 of the individual 304(a) criteria documents). The 304(a) criteria data is several years old and copper is the only metal for which the database could be considered adequate for assessing the speed of action of the metal. The estimates of the kinetic coefficients for freshwater silver, freshwater chromium VI, freshwater nickel, and all of the estimated kinetic coefficients for saltwater metals are considered to be of questionable reliability (due to small data set size and constraints in the model used to estimate the kinetic coefficient).

A review of Table 1 from the May 18, 1995 Stasikowski memorandum, indicates that the averaging periods estimated for freshwater copper for *Ptychochellus*, *Daphnia*, and *Gammarus* (the 1st, 2nd and 3rd most sensitive organisms to copper in the USEPA criteria document database) would all be in excess of 24 hours (based on averaging the individual equivalent averaging periods from the different studies for each organism). Additionally, except for *Lepomis*, the estimated equivalent averaging periods would all be greater than 24 hours. The Department concluded that the database was not suitable to attempt to develop appropriate

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averaging periods because of outdated database, limited numbers of observations, and the still evolving methods for determining appropriate averaging periods. Instead, the Department has concluded that a 24-hour acute averaging period for freshwater copper appears to be protective. For saltwater copper, there were very few studies available, and those studies only provided raw data and no time varying LC50s were calculated. However, the time to effect was in excess of 24 hours in those studies (Personal communication, August 24, 1995, with Charles Delos, Health and Ecological Criteria Division, USEPA, contact person listed in Stasikowski memorandum of May 18, 1995). Accordingly, a 24 hour acute averaging period is considered protective for saltwater copper.

Examination of the data from Tables 1 and 2, regarding cadmium, chromium, lead, mercury, nickel, silver and zinc, enclosed with the May 18, 1995 Stasikowski memorandum indicates that a 6-hour acute averaging period should be protective of the aquatic biota. Accordingly, a 6-hour acute averaging period is being proposed as the default averaging period for these metals in both fresh and salt waters.

Based on the above discussion, the Department is proposing a 24-hour acute averaging period for freshwater and saltwater copper criteria at N.J.A.C. 7:9B-1.14(f)1i and a 6-hour acute averaging period for freshwater and saltwater cadmium, chromium, mercury, nickel, silver, and zinc criteria N.J.A.C. 7:9B-1.14(f)1ii. For all the other proposed acute criteria, the Department is proposing a 1-hour acute averaging period at N.J.A.C. 7:9B-1.14(f)1. The Department confirmed with USEPA that the proposed alternative averaging periods discussed above are protective of aquatic life.

At N.J.A.C. 7:9B-1.14(f)7 the Department is proposing to identify and list criteria for pollutants currently listed at N.J.A.C. 7:9B-1.14(c). In addition, the Department is proposing to change the format of the table for ease of use. Significant revisions are proposed to several criteria. A more detailed description of the derivation of the aquatic criteria for arsenic, cadmium, chromium III, chromium VI, copper, mercury, nickel, selenium, silver, and zinc proposed at N.J.A.C. 7:9B-1.14(f)7 follows:

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Arsenic: The Department is proposing aquatic life-based freshwater and saltwater criteria for arsenic based on the 2004 *National Recommended Water Quality Criteria Table: Poster and Brochure* found at <http://www.epa.gov/waterscience/criteria/>, as shown in Table 3 below. Freshwater acute criterion of 340µg/L and chronic criterion of 150µg/L, as recommended by the NRWQC 2005 were developed as part of the 1995 Updates. The proposed saltwater acute criterion of 69µg/L and chronic criterion of 36µg/L were developed as part of the *Ambient Water Quality Criteria for Arsenic-1984* (EPA 440/5-84-033) using the 1985 Guidelines which can be found at <http://www.epa.gov/waterscience/criteria/>. These saltwater criteria are the existing applicable NTR criteria for New Jersey and are recommended as part of the NRWQC 2005. Both freshwater and saltwater total recoverable criteria were multiplied by the USEPA conversion factor (See Table 1) of 1 to establish the dissolved criteria. Arsenic freshwater and saltwater criteria are also multiplied by a default WER of 1 as recommended by the USEPA. The Department is proposing a 1-hour acute averaging period and 4-day chronic averaging period for arsenic as discussed above.

Cadmium: The Department is proposing aquatic life-based freshwater and saltwater criteria for cadmium as shown in Table 3 below. These criteria are developed as part of the *2001 Update of Ambient Water Quality Criteria for Cadmium* (EPA 882-R-01-001) found at <http://www.epa.gov/waterscience/criteria/> and recommended by the USEPA in NRWQC 2005. The proposed acute and chronic cadmium freshwater criteria are hardness dependent and are expressed as equations (See Table 3). The DRBC freshwater acute and chronic conversion factor of 0.651 (See Table 1), approved by the USEPA, was used to convert the total recoverable cadmium criteria into dissolved criteria. The proposed cadmium freshwater criteria are also multiplied with default WER of 1 as recommended by the USEPA. Criterion can be calculated at any hardness using the equations given below. For example, at hardness 100 mg/L of CaCO₃, the freshwater acute criterion for cadmium would be 1.4 µg/L and the freshwater chronic criterion for cadmium would be 0.17 µg/L (See Table 3).

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Acute dissolved criterion WER $[e^{(1.0166 (\ln [\text{hardness}]) - 3.924)}]$ 0.651

Chronic dissolved criterion WER $[e^{(0.7409 (\ln [\text{hardness}]) - 4.719)}]$ 0.651

The Department is proposing the saltwater acute criterion of 40µg/L and chronic criterion of 8.8µg/L developed as part of the *2001 Update of Ambient Water Quality Criteria for Cadmium* (EPA 882-R-01-001) found at <http://www.epa.gov/waterscience/criteria/> and recommended by the USEPA in 2005 as part of NRWQC 2005. The saline criteria are expressed in the dissolved form using the USEPA conversion factor of 0.994 for both acute and chronic criteria (See Table 3). The proposed cadmium freshwater and saltwater criteria are also multiplied with default WER of 1 as recommended by the USEPA. The Department is proposing a 6-hour acute averaging period and 4-day chronic averaging period for cadmium as discussed above.

Chromium III: The Department is proposing aquatic life-based freshwater criteria for chromium III developed as part of the 1995 Updates and recommended by the USEPA in NRWQC 2005 (See Table 3 below). The proposed freshwater acute and chronic chromium criteria are hardness dependent and are expressed as equations. Criterion can be calculated at any hardness using the equation given below. The DRBC freshwater acute and chronic conversion factor of 0.277 (See Table 1) approved by the USEPA was used to convert the total recoverable chromium III criteria into dissolved criteria. The proposed chromium III freshwater criteria are also multiplied with default WER of 1 as recommended by the USEPA. For example, at hardness 100mg/L of CaCO₃, the freshwater acute criterion for chromium III would be 499 µg/L and the freshwater chronic criterion for chromium III would be 24 µg/L (See Table 3).

Acute dissolved criterion WER $[e^{(0.819 (\ln [\text{hardness}]) + 3.7256)}]$ 0.277

Chronic dissolved criterion WER $[e^{(0.819 (\ln [\text{hardness}]) + 0.6848)}]$ 0.277

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There is insufficient saltwater toxicity data available on chromium III to calculate any saltwater criteria. Therefore, saltwater criteria are neither recommended by the USEPA nor proposed by the Department for chromium III. The Department is proposing a 6-hour acute averaging period and 4-day averaging period for chromium III as discussed above.

Chromium VI: The Department is proposing aquatic life-based freshwater and saltwater criteria for chromium VI developed as part of the 1995 Updates and recommended by the USEPA in NRWQC 2005 as shown in Table 3 below. The freshwater acute dissolved criterion of 15µg/L and chronic dissolved criterion of 10µg/L are developed as part of the 1995 Updates. The DRBC freshwater acute and chronic conversion factor of 0.919 (See Table 1), approved by the USEPA, was used to convert the total recoverable chromium VI criteria into dissolved criteria.

The Department is proposing saltwater acute criterion of 1,100µg/L and chronic criterion of 50µg/L developed as part of the *Ambient Water Quality Criteria for Chromium-1984* (EPA 440/5-84-029) found at <http://www.epa.gov/waterscience/criteria/> using the 1985 Guidelines and recommended by the USEPA in NRWQC 2005. The saltwater criteria are also the existing applicable NTR criteria for New Jersey. The saltwater acute and chronic criteria were multiplied by the USEPA conversion factor of 0.993 to establish the dissolved criteria. The proposed chromium VI freshwater and saltwater criteria are also multiplied with default WER of 1 as recommended by the USEPA. The Department is proposing a 6-hour acute averaging period and 4-day chronic averaging period for chromium VI as discussed above.

Copper: The Department is proposing aquatic life-based freshwater and saltwater criteria for copper developed as part of the 1995 Updates and recommended by the USEPA in NRWQC 2005 as shown in Table 3 below. The proposed freshwater acute and chronic copper criteria are hardness dependent and are expressed as equations. Criterion can be calculated at any hardness using the equation given below. The DRBC conversion factor of 0.908 (See Table 1), approved by the USEPA, was used to convert the total recoverable freshwater acute and chronic copper criteria into dissolved criteria. For example, at hardness 100 mg/L of CaCO₃, the freshwater

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acute criterion for copper would be 13 µg/L and the freshwater chronic criterion for copper would be 8.5 µg/L (See Table 3).

Acute dissolved criterion WER $[e^{(0.9422 (\ln [\text{hardness}]) - 1.7)}]$ 0.908

Chronic dissolved criterion WER $[e^{(0.8545 (\ln [\text{hardness}]) - 1.702)}]$ 0.908

In December 2003, the USEPA published a *2003 Draft Update of Ambient Water Quality Criteria for Copper* (EPA 822-R-03-026) found at <http://www.epa.gov/waterscience/criteria/>. In addition to including several recent studies in the recalculation of the 2003 updated criteria, the USEPA also applied the biotic ligand model (BLM) in the derivation of the freshwater criteria. The BLM is a metal bioavailability model taking a number of water quality constituents (for example, calcium, magnesium, and dissolved organic carbon) into consideration in deriving the aquatic criteria. Unlike the empirically derived hardness dependent criteria, the BLM explicitly accounts for individual water quality variables and addresses variables that were not factored into the hardness relationship. The USEPA has neither finalized the BLM method nor proposed 304(a) criteria based on the same. Therefore, the Department is not proposing copper criteria based on the BLM method. The Department may consider deriving criteria based on the BLM method when the USEPA recommends this method as national guidance.

The proposed saltwater acute dissolved criterion of 4.8µg/L and chronic dissolved criterion of 3.1µg/L were recalculated as part of the New York / New Jersey harbor site-specific copper criteria in 1995 (*Ambient Water Quality Criteria Saltwater Copper Addendum*. April 14, 1995 found at <http://www.epa.gov/waterscience/criteria/>) and recommended by the USEPA in NRWQC 2005. The New York/New Jersey harbor-specific copper acute dissolved criterion of 7.9µg/L and chronic dissolved criterion of 5.6µg/L were promulgated by the Department in 1996 (28 N.J.R. 3782(b), August 5, 1996). The proposed copper freshwater and saltwater criteria are multiplied with default WER of 1 as recommended by the USEPA. The Department is proposing a 24-hour acute averaging period and 4-day chronic averaging period for copper as discussed above.

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Mercury: The Department is proposing freshwater acute dissolved criterion of 1.4µg/L and chronic dissolved criterion of 0.77µg/L developed as part of the 1995 Updates and recommended by the USEPA in the NRWQC 2005 as shown in Table 3 below. The proposed freshwater criteria are multiplied by the USEPA conversion factor of 0.85 to derive the dissolved criteria (See Table 1).

The Department is proposing saltwater acute dissolved criterion of 1.8µg/L and chronic dissolved criterion of 0.94µg/L developed as part of the *Ambient Water Quality Criteria for Mercury-1984* (EPA 440/5-84-026) found at <http://www.epa.gov/waterscience/criteria/> using the 1985 Guidelines and recommended by the USEPA in the NRWQC 2005. The chronic dissolved criterion of 0.025 µg/L derived in the 1984 mercury criteria document is based on the final residue value in accordance with the 1985 Guidelines. However, the USEPA recalculated the saltwater chronic criterion using the 1995 method and recommended the same as part of the NRWQC 2005. The NRWQC 2005 chronic dissolved criterion of 0.94µg/L was derived from dividing the final acute value with the acute chronic ratio of 2. The proposed saltwater criteria are multiplied by the USEPA conversion factor of 0.85 to derive the dissolved criteria. Freshwater and saltwater mercury criteria are multiplied with default WER of 1 as recommended by the USEPA. The Department is proposing a 6-hour acute averaging period and 4-day chronic averaging period for mercury.

The aquatic life-based criteria do not factor in the bioaccumulation of mercury in the food chain. The wildlife criteria proposed by the Department on November 18, 2002 (35 N.J.R. 2264(b)) accounts for bioaccumulation of mercury through the food chain, which resulted in significantly more stringent criteria. The wildlife criteria were not adopted due to lack of implementation procedures. The Department, USEPA and U.S. Fish and Wildlife Service, who have partnered to derive the wildlife criteria, are working to resolve the implementation issues and the Department intends to repropose the wildlife criteria in the future (36 N.J.R. 912(a), February 17, 2004).

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Nickel: The Department is proposing freshwater criteria for nickel developed as part of the 1995 Updates and recommended by the USEPA in the NRWQC 2005 as shown in Table 3 below. The proposed freshwater acute and chronic nickel criteria are hardness dependent and are expressed as equations. Criterion can be calculated at any hardness using the equations given below. The DRBC freshwater acute and chronic conversion factor of 0.846 (See Table 1) approved by the USEPA, was used to convert the total recoverable nickel criteria into dissolved criteria. Freshwater nickel criteria are multiplied with default WER of 1 as recommended by the USEPA. For example, at hardness 100 mg/L of CaCO₃, the freshwater acute criterion for nickel would be 390 µg/L and the freshwater chronic criterion for nickel would be 44 µg/L (See Table 3).

Acute dissolved criterion WER $[e^{(0.846 (\ln [\text{hardness}]) + 2.255)}] 0.846$

Chronic dissolved criterion WER $[e^{(0.846 (\ln [\text{hardness}]) + 0.0584)}] 0.846$

Saltwater Criteria for Nickel: The Department is proposing saltwater criteria for nickel as recommended by the Great Lakes Environmental Center (GLEC). The proposed criteria are recalculated by GLEC in the draft *Technical Information Related to Developing a Saltwater Nickel Addendum to the Ambient Water Quality Criteria Document*, 2003. A copy of this document can be found at <http://www.state.nj.us/dep/wmm/sgwqt/sgwqt.html>. The GLEC used the 1995 methodology to derive the saltwater nickel criteria and updated the existing 1986 USEPA criteria by using additional data. In an April 30, 2003 letter from Christopher Zarba, Acting Director of Health and Ecological Criteria Division, USEPA to Mr. G. M. DeGraeve, Director of Great Lakes Environmental Center, the USEPA noted, as part of their review of the revised criteria, that the derivation of the criteria is favorable.

Saltwater Acute Criterion for Nickel: Additional toxicity studies were gathered by GLEC to recalculate the proposed saltwater criteria for nickel (see Table 3). In addition to the original acute toxicity values used by the USEPA in the *Ambient Water Quality Criteria for Nickel-1986* (EPA 440/5-86-004) found at <http://www.epa.gov/waterscience/criteria/>, more recent acute

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toxicity values (**boldfaced** in Table 2) were used to derive the acute criterion of 64 µg/L. The proposed acute criterion was multiplied by the USEPA conversion factor of 0.99 (Table 1) to derive the dissolved criterion. The criterion was also multiplied with default WER of one as recommended by the USEPA.

Table 2. Derivation of Saltwater Criteria for Nickel

Rank	Genus Mean Acute Value	Species	Species Mean Acute Value	Species Mean Acute-Chronic Ratio
26	320,00	Soft-shell clam <i>Mya arenaria</i>	320,00	
25	294,500	Clam <i>Macoma balthica</i>	294,500	
24	150,000	Starfish <i>Asterias forbesii</i>	150,000	
23	149,900	Mummichog <i>Fundulus heteroclitus</i>	149,900	
22	72,000	Mud snail <i>Nassarius obsoletus</i>	72,000	
21	70,000	Spot <i>Leiostomus xanthurus</i>	70,000	
20	50,000	Polychaete worm <i>Capitella capitata</i>	50,000	
19	47,000	Hermit crab <i>Pagurus longicarpus</i>	47,000	
18	35,000	Polychaete worm <i>Nereis arenaceodentata</i>	4,900	
		Polychaete worm <i>Nereis virens</i>	25,000	
17	26,560	Topsmelt <i>Atherinops affinis</i>	26,560	6.220
16	21,000	Striped bass <i>Morone saxatilis</i>	21,000	
15	18,950	Amphipod <i>Corphium volutator</i>	18,950	
14	17,390	Atlantic silverside <i>Menidia menidia</i>	7,958	
		Tidewater silverside <i>Menidia peninsulae</i>	38,000	

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13	17,000	Polychaete worm <i>Ctenodrilus serratus</i>	17,000	
12	11,250	Copepod <i>Eurytemora affinis</i>	11,250	
11	6,000	Copepod <i>Nitocra spinipes</i>	6,000	
10	4,360	Dungeness crab <i>Cancer magister</i>	4,360	
9	3,466	Copepod <i>Acartia clausi</i>	3,466	
8	2,500	Purple sea urchin <i>Strongylocentrotus purpuratus</i>	2,500	
7	891	Bay mussel <i>Mytilus edulis</i>	891	
6	641.7	Eastern oyster <i>Crassostrea virginica</i>	1180	
		Pacific oyster <i>Crassostrea gigas</i>	349	
5	570.3	Mysid <i>Americamysis bahia</i>	513	5.478*
		Mysid <i>Americamysis bigelowi</i>	634	
4	310	Quahog clam <i>Mercenaria mercenaria</i>	310	
3	151.7	Mysid <i>Herteromysis formosa</i>	151.7	
2	148.6	Mysid <i>Mysidopsis intii</i>	148.6	6.727
1	145.5	Red abalone <i>Haliotis rufescens</i>	145.5	5.505

* The acute chronic ratio (ACR) was calculated using the ACR value in the 1986 criteria document because it was calculated using acute and chronic data from the same test.

Final acute value = 129.61 µg/L

$$= 129.61 / 2 = 64.8 \mu\text{g/L}$$

Dissolved acute criterion = 64.8 x 0.99 = 64.15 µg/L

Saltwater Chronic Criterion for Nickel: GLEC calculated a geometric mean of the four saltwater acute chronic ratios as the final acute chronic ratio 5.96 (See Table 2). The saltwater chronic criterion developed in the *Ambient Water Quality Criteria for Nickel-1986* (EPA 440/5-86-004)

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found at <http://www.epa.gov/waterscience/criteria/> used the acute chronic ratio calculated from two freshwater and one saltwater acute chronic ratios. The proposed chronic value of 22 µg/L for nickel is calculated using the new and updated acute chronic ratio (See Table 2 above). The chronic criterion was multiplied by the USEPA conversion factor of 0.99 (See Table 1) to derive the dissolved criterion. The saltwater nickel criterion was also multiplied with default WER of 1 as recommended by the USEPA. The Department is proposing a 6-hour acute averaging period and 4-day chronic averaging period for nickel as discussed above.

Final chronic criterion = FAV / ACR

$$= 129.61/5.96 = 21.96 \mu\text{g/L}$$

Dissolved chronic criterion = $21.96 \times 0.99 = 21.74 \mu\text{g/L}$

Selenium: The Department is proposing aquatic life-based freshwater and saltwater criteria for selenium based on the NTR, as shown in Table 3 below. The NRWQC 2005 freshwater criteria for selenium were developed as part of the 1995 Updates. However, the 2005 *National Recommended Water Quality Criteria* found at <http://www.epa.gov/waterscience/criteria/>, indicates that the freshwater acute criterion is under review and the 2005 recommended criterion may change substantially in the near future. Therefore, the Department is proposing the freshwater acute criterion of 20µg/L and chronic criterion of 5.0µg/L based on NTR and developed as part of the *Ambient Water Quality Criteria for Selenium-1987* (EPA 440/5-87-006) found at <http://www.epa.gov/waterscience/criteria/>. The Department will revise the freshwater criteria, if necessary, when the USEPA finalizes the revised criteria for selenium. The USEPA recommended conversion factors of 0.996 for acute and 0.992 for chronic (See Table 1) were used to convert the total recoverable freshwater selenium acute and chronic criteria into dissolved criteria.

The proposed saltwater acute criterion of 290µg/L and chronic criterion of 71µg/L are based on the *Ambient Water Quality Criteria for Selenium-1987* (EPA 440/5-87-006) found at <http://www.epa.gov/waterscience/criteria/> using the 1985 Guidelines and are recommended by the USEPA in the NRWQC 2005. The saltwater acute and chronic criteria were multiplied by

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the USEPA conversion factor of 0.998 to derive the dissolved form of the metal. The proposed freshwater and saltwater selenium criteria are multiplied by a default WER of 1 as recommended by the USEPA. The Department is proposing a 1-hour acute averaging period and 4-day chronic averaging period for selenium as discussed above.

Silver: The Department is proposing aquatic life-based freshwater and saltwater acute criteria developed as part of the *Ambient Water Quality Criteria for Silver-1980* (EPA 440/5-80-071) found at <http://www.epa.gov/waterscience/criteria/> and recommended by the USEPA in the NRWQC 2005 as shown in Table 3 below. The proposed freshwater acute silver criterion is hardness dependent and is expressed as an equation. Criterion can be calculated at any hardness using the equation given below. For example, at hardness 100 mg/L of CaCO₃, the freshwater acute criterion for silver would be 3.2µg/L (See Table 3). The Department is proposing to use the USEPA conversion factor of 0.85 (See Table 1) to convert the total recoverable freshwater and saltwater acute silver criteria into dissolved criteria. The proposed freshwater and saltwater silver criteria are multiplied by a default WER of 1 as recommended by the USEPA. The Department is proposing a 6-hour acute averaging period and 4-day averaging period for silver as discussed above.

Acute dissolved criterion WER $[e^{(1.72 (\ln [\text{hardness}]) - 6.59)}] 0.85$

There is insufficient chronic toxicity data available for silver to calculate any freshwater or saltwater chronic criteria. Therefore, freshwater and saltwater chronic criteria are neither recommended by the USEPA nor proposed by the Department for silver.

Zinc: The Department is proposing aquatic life-based freshwater criteria developed as part of the 1995 Updates and recommended by the USEPA in the NRWQC 2005 as shown in Table 3 below. The freshwater are the same value for both acute and chronic criteria. The proposed freshwater acute and chronic zinc criteria are hardness dependent and are expressed as equations. Criterion can be calculated at any hardness using the equations given below. The DRBC

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freshwater acute and chronic conversion factor of 0.950 (See Table 1), approved by the USEPA, was used to convert the total recoverable zinc criteria into dissolved criteria. For example, at hardness 100 mg/L of CaCO₃, the freshwater acute and chronic criterion for zinc would be 110 µg/L (See Table 3 below).

Acute or dissolved criterion WER $[e^{(0.8473 (\ln [\text{hardness}]) + 0.884)}] 0.950$

Chronic dissolved criterion WER $[e^{(0.8473 (\ln [\text{hardness}]) + 0.884)}] 0.950$

The proposed saltwater acute criterion of 90µg/L and chronic criterion of 81µg/L were developed as part of the *Ambient Water Quality Criteria for Zinc-1987* (EPA 440/5-87-003) found at <http://www.epa.gov/waterscience/criteria/> using the 1985 Guidelines and are recommended by the USEPA in the NRWQC 2005. The saltwater criteria are the existing applicable NTR criteria for New Jersey. The proposed saltwater criteria were multiplied by the USEPA recommended conversion factor of 0.946 (See Table 1) to establish dissolved criteria. Freshwater and saltwater zinc criteria are multiplied with default WER of 1 as recommended by the USEPA. The Department is proposing a 6-hour acute averaging period and 4-day chronic averaging period for zinc as discussed above.

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Table 3. PROPOSED AQUATIC LIFE-BASED CRITERIA
(µg/L)

Toxic Substance	Fresh Water Criteria		Saline Water Criteria	
	Acute	Chronic	Acute	Chronic
Arsenic	340* D	150* D	69* D	36* D
gamma-BHC (Lindane)	0.95	N/A	N/A	N/A
Cadmium	WER $[e^{(1.0166[\ln(\text{hardness})]-3.924)}]$ 0.651 D	WER $[e^{(0.7409[\ln(\text{hardness})]-4.719)}]$ 0.651 D	40* D	8.8* D
Chromium (III)	WER $[e^{(0.819[\ln(\text{hardness})]+3.7256)}]$ 0.277 D	WER $[e^{(0.819[\ln(\text{hardness})]+0.6848)}]$ 0.277 D	N/A	N/A
Chromium (VI)	15 D	10 D	1,100* D	50* D
Copper	WER $[e^{(0.9422[\ln(\text{hardness})]-1.7)}]$ 0.908 D	WER $[e^{(0.8545[\ln(\text{hardness})]-1.702)}]$ 0.908 D	4.8* D #	3.1* D #
Dieldrin	0.24	0.056	N/A	N/A
Endrin	0.086	0.036	N/A	N/A
Mercury	1.4 m * D	0.77 m * D	1.8* D	0.94* D
Nickel	WER $[e^{(0.846[\ln(\text{hardness})]+2.255)}]$ 0.846 D	WER $[e^{(0.846[\ln(\text{hardness})]+0.0584)}]$ 0.846 D	64* D	22* D
Pentachlorophenol	$e^{(1.005[\text{pH}]-4.869)}$	$e^{(1.005[\text{pH}]-5.134)}$	N/A	N/A
Selenium	20 D	5.0 D	290* D	71* D
Silver	WER $[e^{(1.72[\ln(\text{hardness})]-6.59)}]$ 0.85 D	N/A	1.9* r	N/A
Zinc	WER $[e^{(0.8473[\ln(\text{hardness})]+0.884)}]$ 0.950 D	WER $[e^{(0.8473[\ln(\text{hardness})]+0.884)}]$ 0.950 D	90* D	81* D

* Criteria are expressed as a function of the Water Effect Ratio (WER). The WER equates to the default value of 1.0.

D Criteria expressed as dissolved

Criteria applicable to all saline waters except, site-specific criteria listed at N.J.A.C. 7:9B-1.14(g)

m This recommended water quality criterion was derived from data for inorganic mercury (II), but is applied here to total mercury. If a substantial portion of the mercury in the water column is methylmercury, this criterion will probably be under protective. In addition, even though inorganic mercury is converted to methylmercury which bioaccumulates to a great extent, this criterion does not account for uptake via the food chain because sufficient data were not available when the criterion was derived.

r This recommended water quality criterion was derived on page 43 of the mercury criteria document (EPA 440/5-84-026, January 1985). The saltwater CCC of 0.025 µg/L given on page 23 of the criteria document is based on the Final Residue Value procedure in the 1985 Guidelines. Since the publication of the Great Lakes Aquatic Life Criteria Guidelines in 1995 (60FR15393-15399, March 23, 1995), the USEPA no longer uses the Final Residue Value procedure for deriving CCCs for new or revised 304(a) aquatic life criteria.

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Aquatic criteria for other toxic pollutants:

The Department is proposing to update the aquatic life-based freshwater criteria for gamma BHC, dieldrin, endrin, and pentachlorophenol based on updated toxicity information in the NRWQC 2005. These freshwater criteria were updated and revised as part of the 1995 Updates. There are no revised saltwater criteria recommendations available for gamma BHC, dieldrin, endrin, and pentachlorophenol, therefore, the Department is retaining the existing criteria.

At N.J.A.C. 7:9B-1.14(f)4 the Department is proposing to identify the pH dependent formulas used in the derivation of criteria for pentachlorophenol.

Human Health Criteria:

At N.J.A.C. 7:9B-1.14(f)5 the Department is proposing to identify the averaging period and the design flow applicable to human health criteria for non-carcinogens currently listed at N.J.A.C. 7:9B-1.5(c)2 and under the Note at N.J.A.C. 7:9B-1.14(c).

At N.J.A.C. 7:9B-1.14(f)6 the Department is proposing to identify the averaging period and the design flow applicable to human health criteria for carcinogens currently listed at N.J.A.C. 7:9B-1.5(c)2 and under the Note at N.J.A.C. 7:9B-1.14(c).

At N.J.A.C. 7:9B-1.14(f)7 the Department is proposing to identify and list criteria for pollutants currently listed at N.J.A.C. 7:9B-1.14(c). In addition, the Department is proposing to change the format of the table for ease of use. Significant revisions are proposed to several criteria as described below:

Human health water quality criteria are numeric values that are developed to protect water quality for designated uses such as potable water supply and consumption of fish. The numeric criterion for each pollutant is derived on the basis of human health concerns without

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regard to economic impacts or technical feasibility. USEPA has published recommended criteria for many pollutants pursuant to Section 304(a) of the Clean Water Act.

In accordance with 40 CFR 131.11, which contains recommended 304(a) criteria, the States may adopt the national recommended criteria, modify the national recommended criteria to reflect site-specific conditions, adopt criteria derived using other scientifically defensible methods or establish narrative criteria when numeric criteria cannot be determined.

The Department's proposed new and revised human health criteria have been developed in accordance with the *Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health (2000)* (EPA-822-B-00-004, October 2000) (2000 Human Health Methodology) found at <http://www.epa.gov/waterscience/criteria/>. The 2000 Human Health Methodology sets forth the USEPA's current approach to derive human health criteria with regard to risk assessment for cancer and non-cancer effects, exposure assessment and bioaccumulation (See 65 Fed. Reg. 66444, November 3, 2000 found at <http://www.epa.gov/fedrgstr/EPA-WATER/>).

Derivation of a human health water quality criterion is based upon whether the toxic pollutant is classified as a carcinogen or a non-carcinogen. The USEPA developed a categorization system for toxic pollutants based upon the overall weight of evidence for human carcinogenicity. Toxic pollutants classified as Group A are "human carcinogens"; Group B are "probable human carcinogens"; Group C are "possible human carcinogens"; Group D are "not classifiable as to human carcinogenicity"; and Group E include those with "evidence of non-carcinogenicity for humans."

The USEPA, in an effort to update the carcinogenic risk assessment guidelines, is in the process of replacing the alphanumeric system of categorizing carcinogenic effects, i.e., Groups A, B, C, D and E, with descriptors. *Guidelines for Carcinogenic Risk Assessment* was finally issued on March 29, 2005 (EPA/630/P-03/001F) available at <http://www.epa.gov/cancerguidelines> and Notice of Availability was published in the Federal

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Register (70 Fed. Reg. 17766, April 7, 2005) to replace the 1986 Guidelines (The *Risk Assessment Guidelines of 1986* (EPA/630/R-00/004) (51 Fed. Reg. 33992, September 24, 1986 available at <http://www.epa.gov/cancerguidelines>). For risk assessments that have been completed before issuance of the new Guidelines, both the prior carcinogenicity categorization and narrative descriptors are recognized, consistent with the implementation direction provided by the USEPA (Memorandum from Acting Administrator Stephen L. Johnson to USEPA staff on Application of New Cancer Guidelines, March 29, 2005). The Department is adding definitions of carcinogens and non-carcinogens in these rules to incorporate changes in terminology to describe carcinogens and non-carcinogens.

Human health water quality criteria are derived by classifying the toxic pollutant as to human carcinogenicity and utilizing the appropriate toxicity factor (oral slope factor for carcinogens or oral reference dose (RfD) for non-carcinogens) and exposure assumptions. For freshwaters, the exposure assumptions are based on drinking water and fish consumption. For saline waters (SE/SC), the exposure assumptions are based on fish consumption only.

For sources of toxicity information for developing health-based criteria, the Department utilized the USEPA Integrated Risk Information System (IRIS) database as the primary source. The USEPA has developed this database of human health effects to provide consistent information on toxic substances for use in risk assessments, decision making and regulatory activities. IRIS is an electronic database (<http://www.epa.gov/iris>) that contains information on human health effects that may result from exposure to various pollutants in the environment. Developed in response to a growing demand for consistent information for use in risk assessment, decision-making and regulatory activities, IRIS data represent the consensus of USEPA health scientists. The IRIS chemical files contain descriptive and quantitative information on the Chronic Health Hazard Assessments for Non-Carcinogenic Effects and Carcinogenicity Assessment for Lifetime Exposure. It documents fully the derivation of its toxicity factors, such as the oral reference dose (RfD) for chronic non-carcinogenic health effects and oral carcinogenic slope factors for carcinogenic effects and the carcinogenicity

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categorization of the pollutant. These data serve as the best available scientific information at the time and continue to be reviewed and updated periodically to reflect current science.

Notable among USEPA's recommended changes in the 2000 Human Health Methodology are the inclusion of the relative source contribution (RSC) factor in deriving human health criteria for non-carcinogens and the sharply higher fish intake rates for deriving all criteria.

Relative Source Contribution (RSC) is a term included in the derivation of criteria to account for non-water sources of exposure. It represents the percentage of total exposure typically accounted for by the exposure source for which the criterion is being determined. Exposure can also be estimated by the subtraction method. Historically, RSC has been used to develop the maximum contaminant level goal (MCLG) which is the health-based standard for the drinking water program. The 2000 Human Health Methodology recommends the RSC approach be used to derive ambient water quality criteria for non-carcinogens and carcinogens with a threshold so that the total exposure will not exceed the threshold level and exposure to non-water sources will be considered along with water and fish intake. The change to include additional exposures from other sources will result in more stringent criteria and lead to better protection of human health. However, exposure data are not always available. In the absence of specific data, a range consisting of a 20% floor and 80% ceiling has been recommended by the USEPA for criteria derivation as it is with deriving the maximum contaminant level goal for drinking water.

To account for the exposure to toxic substances due to fish ingestion, the USEPA recommends a new national default rate of 17.5 g/day of fish intake for deriving its national 304(a) criteria *Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health (2000)* (EPA-822-B-00-004, October 2000) (2000 Human Health Methodology) found at <http://www.epa.gov/waterscience/criteria/>. Because of the surge in seafood consumption in recent years this new rate replaces the existing default rate of 6.5 g/day that had been in use by the USEPA and the States to set the ambient water quality criteria for the last 20

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years. The new rate, more accurately reflecting the current level of fish consumption, is based on the uncooked weight from the intake of freshwater and estuarine finfish and shellfish by the general population and represents the 90th percentile of the 1994-96 USDA CSFII Survey (Continuing Survey of Food Intakes by Individuals).

Listed below are the equations used for deriving human health criteria for carcinogens and non-carcinogens for freshwater and saline waters, consistent with the USEPA's current recommendations in the NRWQC. The Department has used the defaults specified in the USEPA recommendation unless otherwise noted - Adult body weight of 70 kg, drinking water consumption rate of 2L/day, fish consumption rate of 0.0175 kg/day and conversion factor of 1000 µg/mg (*National Recommended Water Quality Criteria: 2002, Human Health Criteria Calculation Matrix* (EPA-822-R-02-012, November 2002, p. 19) (Calculation Matrix) found at <http://www.epa.gov/waterscience/criteria>. Human health criteria for carcinogens are developed based on a lifetime incremental cancer risk of one in one million.

For carcinogens in freshwater:

$$\text{Criterion } (\mu\text{g/L}) = (\text{cancer risk level/oral carcinogenic slope factor}) * (\text{adult body weight} * \text{conversion factor}) / [\text{drinking water consumption} + (\text{fish consumption} * \text{bioconcentration factor})]$$

For carcinogens in saline water:

$$\text{Criterion } (\mu\text{g/L}) = (\text{cancer risk level/oral carcinogenic slope factor}) * (\text{adult body weight} * \text{conversion factor}) / (\text{fish consumption} * \text{bioconcentration factor})$$

For non-carcinogens in freshwater:

$$\text{Criterion } (\mu\text{g/L}) = (\text{reference dose} * \text{relative source contribution}) * (\text{adult body weight} * \text{conversion factor}) / [\text{drinking water consumption} + (\text{fish consumption} * \text{bioconcentration factor})]$$

For non-carcinogens in saline water:

$$\text{Criterion } (\mu\text{g/L}) = (\text{reference dose} * \text{relative source contribution}) * (\text{adult body weight} * \text{conversion factor}) / (\text{fish consumption} * \text{bioconcentration factor})$$

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USEPA National Recommended Water Quality Criteria (NRWQC): In 2002 the USEPA issued the *National Recommended Water Quality Criteria: 2002* (EPA-822-R-02-047, November 2002) (NRWQC 2002) which revises many of the human health criteria published in the 1999 *National Recommended Water Quality Criteria-Correction* (EPA 822-Z-99-001, April 1999) (NRWQC 1999). The 1999 document was issued to correct the 1998 *National Recommended Water Quality Criteria; Republication* (63 Fed. Reg. 68354, December 10, 1998 found at <http://www.epa.gov/fedrgstr/EPA-WATER>). The 2002 publication was followed by the Federal Register notices entitled *Revision of National Recommended Water Quality Criteria* (67 Fed. Reg. 79091, December 27, 2002) and *National Recommended Water Quality Criteria for the Protection of Human Health* (68 Fed. Reg. 75507, December 31, 2003 found at <http://www.epa.gov/fedrgstr/EPA-WATER>) (NRWQC 2003). The former Federal Register notice solicited scientific views on the recalculation of criteria for 15 pollutants, while the latter provided the revised criteria for the 15 pollutants. In May 2005, the USEPA announced the availability of *National Recommended Water Quality Criteria Table: Poster and Brochure* (found at <http://www.epa.gov/waterscience/criteria>) to reflect the compilation of the updated information already published in 2002 and 2003. The updated criteria developed pursuant to section 304(a)(1) of the Clean Water Act (CWA) serve as guidance to the States to establish their water quality standards for protecting designated uses. The criteria in these publications supersede that developed earlier by the USEPA which have provided the basis of the existing criteria for New Jersey.

In general, criteria revisions by the USEPA represent only partial updates of the 304(a) criteria based on the 2000 Human Health Methodology. As shown in the Calculation Matrix, the extent of criteria revision varies from pollutant to pollutant. The Calculation Matrix contains information on the toxicity factors, RSCs, fish intake values, BCFs and the equations used to derive the criteria. Except as noted, the new default fish consumption rate of 17.5 g/day is applied consistently to criteria derivations in these publications. However, the use of an RSC term with a 20% floor introduced by the new 2000 Human Health Methodology is included mainly for the 15 pollutants finalized in 2003. Though recommended as part of the 2000 Human

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Health Methodology, USEPA acknowledged that the bioaccumulation factor (BAF) component is considered time- and resource-intensive. Therefore, the NRWQC were developed with the bioconcentration factors (BCFs) made available in 1980 and used in developing the 1992 National Toxics Rule. The lifetime excess cancer risk level associated with criteria developed for carcinogens remains at one-in-one-million (10^{-6}), as in the 1992 NTR.

The proposed criteria are rounded to two significant figures from the final calculations. Rounding follows the general scientific practice of dropping digits that are not significant, as recommended by the USEPA 2000 Human Health Methodology. If the digit 6, 7, 8, or 9 is dropped, the preceding digit is increased by one; if the digit 0, 1, 2, 3, or 4 is dropped, the preceding digit remains the same. If the digit 5 is dropped, then the preceding digit is rounded to the nearest even number. For example, 2.25 becomes 2.2, and 2.35 becomes 2.4.

The Department has incorporated the NRWQC published in 2002 and 2003 into this rule proposal, to the maximum extent possible. As stated earlier, the current NRWQC were derived recently based on the 2000 Methodology, including applicable equations, the default fish intake rate of 17.5 g/day, toxicity factors, the 1980 BCFs and for some criteria, the RSCs. The detailed basis of the component factors and the appropriate equations for calculating the 2002 NRWQC can be found in the companion document *National Recommended Water Quality Criteria: 2002, Human Health Criteria Calculation Matrix* mentioned earlier available at <http://www.epa.gov/waterscience/criteria>. For the NRWQC finalized in 2003, the Federal Register Notice, *National Recommended Water Quality Criteria for the Protection of Human Health* (68 Fed. Reg. 75507, December 31, 2003 found at <http://www.epa.gov/fedrgstr/EPA-WATER>) contains the relevant information.

For mercury, in the absence of any recent update of water column criteria, the Department considers it important to be consistent with the NTR human health criteria that the USEPA promulgated for the NTR States. Therefore, the Department is proposing to adopt the USEPA criteria for mercury published in the National Recommended Water Quality Criteria 1999 rather than the fish tissue value for methyl mercury in the 2002 NRWQC listed for

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mercury. The proposed criterion at 0.050 µg/L for water and organism consumption and the criterion at 0.051 µg/L for organism consumption only are the USEPA 1999 update of the mercury criteria (listed under 1998 NRWQC in 2002 Calculation Matrix, based on neurological effects in infants). The Department has decided not to propose the fish tissue value for methylmercury at 0.3 mg/kg issued by the USEPA (66 Fed. Reg. 1344, January 8, 2001 available at <http://www.epa.gov/fedrgstr/EPA-WATER>) until the USEPA has developed implementation procedures. However, the Department may use the fish tissue criteria for evaluating impairment.

For easy reference, Table 4 titled "Chemical-Specific Surface Water Human Health Criteria" lists the criteria to be proposed along with the existing criteria, and NRWQC human health criteria for comparison. In addition, the Department sets forth the basis for criteria derivation for all criteria in this proposal in Table 5 "Basis for Human Health Criteria Derivation" including those based on the NRWQC, even though data for these criteria are available in the USEPA documents cited above. Criteria based on NRWQC constitute by far the largest single group of human health criteria in this proposal. The basis for these criteria is marked in Table 5 as "NR99", "NR02" or "NR03", referring to NRWQC published in 1999, 2002 or 2003, respectively.

While the Department accepts the USEPA's 2000 Human Health Methodology and generally supports its approaches and default values for criteria derivations, the Department has modified the NRWQC-based criteria for certain pollutants for the proposal. In addition, the Department is proposing criteria for a number of other pollutants derived by standard methodology or using other scientifically defensible methods. The Department determined that further efforts are needed in the following areas, namely: 1). Using IRIS toxicity information to update the NRWQC or to develop criteria not yet in NRWQC, 2). Developing and revising SWQS criteria based on toxicity recommendations from the New Jersey Drinking Water Quality Institute (NJDWQI), 3). Updating the NRWQC with information contained in the current National Primary Drinking Water Regulations (NPDWR), 4). Incorporating the new NJDEP approach for risk assessment for Group C carcinogens, where applicable, and 5). Utilizing the USEPA guidance for quantitative risk assessment of polycyclic aromatic hydrocarbons (PAHs).

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Criteria are developed for the proposal as detailed below under the abbreviated headings of IRIS, NJDWQI, NPDWR, Group C Policy and RPF (see discussion below). These subject headings are also indicated in Table 5 as the basis for the human health criteria derivation for the specific pollutant.

IRIS: Criteria under this heading are limited to NRWQC updated by the Department with IRIS or criteria developed by the Department using IRIS data where NRWQC is lacking. For deriving the NRWQC the USEPA used toxicity data posted on IRIS as of May 17, 2002. To reflect more recent science the Department reviewed IRIS through February 1, 2005 for applicable information. The Department uses the updated toxicity data directly from IRIS to derive the criteria, while all other component factors of the 2000 Methodology calculations (fish intake values, BCFs and RSC), are being retained as presented in the USEPA data source (the 2002 Calculation Matrix or the 2003 Federal Register Notice) mentioned above. The basis for deriving these criteria is noted in Table 5 as “IRIS”.

In addition to the derivation factors shown in Table 5 for toxic substances based on IRIS, additional information is provided below for clarification or to explain the variations from standard methodology, default assumptions and approaches used in individual criteria development.

- a. Acrolein: The 2002 NRWQC are 190 µg/L for water and fish consumption and 290 µg/L for fish consumption only. The USEPA recently updated the health assessment information for acrolein in IRIS on June 3, 2003. Carcinogenicity Assessment for acrolein was revised to “data are inadequate for an assessment of human carcinogenic potential” which is equivalent to Group D. The RfD has been revised to 0.0005 mg/kg-day. Based on the new data, with fish intake value at 17.5 g/day and the BCF at 215 L/kg, the Department has derived a freshwater criterion at 6.1 µg/L and a saline criterion at 9.3 µg/L.

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- b. Arsenic: The Department is proposing a freshwater criterion at 0.017 µg/L and a saline criterion at 0.061 µg/L for arsenic based on the current IRIS carcinogenic slope factor, updated fish intake rate and BCF listed in the 2002 Calculation Matrix instead of the 2002 NRWQC which are based on outdated information at 0.018 µg/L for consumption of water and fish and 0.14 µg/L for consumption of fish only. The slope factor for inorganic arsenic has been utilized to derive criteria for total arsenic that includes inorganic and organic arsenic because of the interconversion of the arsenic species both in the environment and in the body. Furthermore, the analytical methods used do not usually speciate arsenic.
- c. Beryllium: Beryllium is listed in the existing SWQS as “Reserved”. There is no NRWQC for beryllium. The USEPA has classified beryllium via the oral route equivalent to a Group C carcinogen in the Final Rule of the National Primary Drinking Water Regulations (57 Fed. Reg. 31776, July 17, 1992 available at <http://www.epa.gov/fedrgstr/EPA-WATER>). The Department is proposing a freshwater criterion at 6.0 µg/L and a saline criterion 42 µg/L for beryllium based on the IRIS oral RfD of 0.002 mg/kg-day and a Group C designation. There is no oral slope factor available in IRIS. Therefore, equation e and equation f (See section below on Group C Policy) listed in Table 5 are used for criteria derivation.
- d. Cadmium: There is no NRWQC for cadmium for human health protection. The existing freshwater criterion for cadmium at 10 µg/L originated from the 1976 USEPA *Quality Criteria for Water* (The Red Book available at <http://www.epa.gov/waterscience/criteria>). The 2002 Calculation Matrix as well as the current IRIS list RfD for food as 0.001 mg/kg-day in addition to an RfD for water as 0.0005 mg/kg-day. The Department used RfD for food to calculate a saline criterion to be 16 µg/L with standard equation for deriving noncarcinogenic saline criteria, using the RSC of 25% as listed in the Calculation Matrix, 17.5 g/day fish ingestion rate, and the 1980 BCF of 64 L/kg. To calculate the freshwater criterion at 3.4 µg/L, the RfD for drinking water was used while compensating for the reduced

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absorption of fish consumption by a factor of one-half ($0.0005/0.001 = 1/2$) in the modified equation c as shown below. The absorption from fish consumption is adjusted by a factor of one half because cadmium is less absorbed through food than through water.

$$\text{Freshwaters Criterion} = \frac{0.0005 \text{ mg/kg-day} \times 70 \text{ kg} \times 1000 \text{ } \mu\text{g/mg}}{2\text{L/day} + [(0.0175 \text{ kg/day}) \times 1/2 \times 64 \text{ L/kg}]} \times 25\% = 3.4 \text{ } \mu\text{g/L}$$

- e. Chloroform: The NRWQC for chloroform with 5.7 $\mu\text{g/L}$ for consumption of water and fish and 470 $\mu\text{g/L}$ for fish consumption only are based on the 1980 methodology. The USEPA has reviewed health assessment information for chloroform and published an update in IRIS on October 19, 2001. Chloroform is classified as a B₂ carcinogen, but with no given oral slope factor. The proposed criterion for chloroform is based on an RfD for a non-carcinogenic effect. USEPA has concluded that the carcinogenicity of chloroform occurs through a mechanism involving cytotoxicity for which a threshold exists. Cytotoxicity is considered to be the critical effect for carcinogenesis by chloroform and chloroform-induced carcinogenicity is secondary to cytotoxicity. Therefore, the RfD which is based upon cytotoxicity, is considered to be protective against the carcinogenicity of chloroform. Based on an IRIS RfD of 0.01 mg/kg-day, with fish intake value at 17.5 g/day, RSC at 20%, and the BCF at 3.75 L/kg, the Department has derived a freshwater criterion for chloroform at 68 $\mu\text{g/L}$ and a saline criterion at 2,100 $\mu\text{g/L}$.
- f. Chromium: There is no NRWQC for chromium III or chromium VI for human health protection. The existing freshwater and saline criteria are at 160 $\mu\text{g/L}$ and 3230 $\mu\text{g/L}$ respectively. Based on the IRIS RfD of 0.003 mg/kg-day for chromium VI, BCF at 16 L/kg and default exposure values, a freshwater criterion at 92 $\mu\text{g/L}$ and a saline criterion at 750 $\mu\text{g/L}$ are developed for total chromium. The criteria are based on the IRIS RfD for chromium VI, the more toxic chromium species, because the two

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- valence states of chromium are in a dynamic equilibrium depending on the environmental conditions and a clear separation for valence-specific consideration is not feasible.
- g. Dimethyl phthalate: There are no data in the Oral RfD Assessment Section in IRIS (noted March 1, 1994) to support or update the existing criteria. Therefore, no criteria will be proposed for dimethyl phthalate.
 - h. Endosulfan: The IRIS RfD is based on the toxicity testing of a technical grade of endosulfan (mixture of alpha- and beta- stereoisomers). Therefore, the criteria should be expressed accordingly for endosulfan as a mixture of alpha- and beta- isomers rather than a specific isomer, alpha-endosulfan or beta-endosulfan as in the NRWQC.
 - i. Phenol: The NRWQC are at 21,000 µg/L for consumption of water and fish and 1,700,000 µg/L for consumption of fish only. The IRIS RfD was revised from 0.6 µg/L to 0.3 µg/L (September 30, 2002). Thus, the Department updated the criteria based on the current IRIS information, fish consumption rate of 17.5 g/day and BCF at 1.4 L/kg to a freshwater criterion at 10,000 µg/L and a saline criterion at 860,000 µg/L.

NJDWQI: The New Jersey Drinking Water Quality Institute (NJDWQI) established under the 1984 amendments to the New Jersey Safe Drinking Water Act (NJSDWA) (commonly known as the A-280) develops and recommends drinking water standards pursuant to N.J.S.A. 58:12A-13. For toxic substances which have been addressed by the NJDWQI, the Department is using the toxicity factors which form the basis of the health-based levels for drinking water rather than those from IRIS for developing criteria for surface water. Because of the interface of surface water with drinking water and ground water, the Department uses these toxicity factors developed pursuant to the NJSDWA to provide a consistent level of human health protection for all water-related programs.

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For the proposal, criteria for freshwaters and saline waters for 20 toxic substances are based on NJDWQI recommendations as shown in Table 5. Table 5 also contains detailed toxicity information for criteria development abstracted from the documents prepared by the NJDWQI titled “*Maximum Contaminant Level Recommendations for Hazardous Contaminants in Drinking Water, Appendix B, Health-Based Maximum Contaminant Level Support Documents*, March 26, 1987” and in “*Maximum Contaminant Level Recommendations for Hazardous Contaminants in Drinking Water, Appendix A, Health-Based Maximum Contaminant Level Support Documents and Addenda*, September 26 1994” (<http://www.nj.gov/dep/watersupply>).

Aside from utilizing the toxicity factors derived by the NJDWQI, the derivation of the criteria follows standard methodology for SWQS criteria derivation, using the USEPA updated default fish intake of 17.5 g/day. The BCFs are from the 1980 USEPA Ambient Water Quality Criteria documents except for the new NJDWQI pollutant methyl tert-butyl ether (MTBE). MTBE has been added to the list of pollutants to be regulated under the SWQS. The Department proposes to incorporate the 20% relative source contribution recommended by the *Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health (2000)* (EPA-822-B-00-004, October 2000 found at <http://www.epa.gov/waterscience/criteria>) into the criterion. Relative source contribution of 20% is used as a default in the absence of chemical-specific RSC. A 20% RSC is used in developing the MCL for MTBE promulgated by New Jersey through the Safe Drinking Water Program. No saline criterion is being proposed for MTBE for saline waters, as it is not considered to be bioaccumulative. The Department’s new risk assessment approach for Group C carcinogens does not apply at this time to NJDWQI pollutants. (See paragraph on Group C Policy below).

NPDWR: The Department is readopting without change the criteria for barium and methoxychlor which are based on the National Primary Drinking Water Regulations (NPDWR) instead of the NRWQC for these two pollutants because they are based on pre 1980 data.

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Group C Methodology: Group C carcinogens are those agents categorized as possible human carcinogens because the evidence for carcinogenicity is not sufficient for them to be categorized as probable human carcinogens. To develop standards/criteria for Group C carcinogens with a consistent approach throughout its implementing programs, the Department has established a new single approach that is technically defensible as well as compatible with USEPA's various programs.

The new Group C approach specifies that the health-based criteria for Group C carcinogens be developed with the use of a carcinogenic slope factor at a 10^{-6} excess cancer risk level, if such a slope factor is judged by the Department as technically sound. If such a slope factor is not available, the risk assessment will then be based on non-carcinogenic effects using a reference dose with an additional uncertainty factor of ten to protect from possible carcinogenic effects (See Table 5, equations e and f used for criteria derivation).

Because the existing Group C policy specifies that non-carcinogenic criteria be developed preferentially and carcinogenic criteria, if developed, be at the 10^{-5} excess cancer risk level, the criteria for a number of pollutants in the existing SWQS have been changed to reflect the new policy. The change could be significant as with those of dibromochloromethane. "Group C Policy" is noted in Table 5 under "Basis" to account for the difference from the NRWQC as in the case of butylbenzyl phthalate. This new approach for risk assessment of Group C carcinogens is applied at this time to all Group C carcinogens except those addressed by the New Jersey Drinking Water Quality Institute (NJDWQI). For this group of toxic substances, new criteria will be established when the NJSDWA rules are updated.

As noted above, the USEPA has finalized its revised Guidelines for Carcinogen Risk Assessment in March 2005 to replace the alphanumeric categorization such as Group C with narrative descriptors. Consistent with USEPA Memorandum on Application of New

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Cancer Guidelines that the current completed risk assessment is considered scientifically sound until reassessment under the new Guidelines, the Department will continue to use its new approach for Group C pollutants until they have been reassessed under the 2005 Guidelines.

RPF: The relative potency factors (RPFs) are applicable to Group B2 Polycyclic Aromatic Hydrocarbons (PAHs). Rather than assigning the same slope factors to all B2 PAHs as with the NRWQC, the Department considers it more technically preferable to utilize the relative potency approach to derive the slope factors of the individual PAH for use in criteria development. Therefore, the criteria are different from those in the NRWQC. The individual slope factors are derived by multiplying the IRIS slope factor of benzo(a)pyrene of $7.3 \text{ (mg/kg-day)}^{-1}$ by the relative potency estimate for the individual PAH recommended in the USEPA “*Provisional Guidance for Quantitative Risk Assessment of Polycyclic Aromatic Hydrocarbons*” (EPA/600/R-93/089). The relative potencies based on that of benzo(a)pyrene as 1.0 are cited as follows: benz(a)anthracene, 0.1; benzo(b)fluoranthene, 0.1; benzo(k)fluoranthene, 0.01; chrysene, 0.001; dibenz(a,h)anthracene, 1.0; and indeno(1,2,3-c,d)pyrene, 0.1.

NTR Criteria: New Jersey is under the NTR for 11 human health criteria. For a general discussion of NTR, see discussion under N.J.A.C. 7:9B-1.14, Surface water quality criteria above. Included in this group are one freshwater criterion for gamma-BHC and one saline criterion each for gamma-BHC, chlorodibromomethane, 1,1-dichloroethylene, fluorene, hexachlorobutadiene, isophorone, 1,1,2,2-tetrachloroethane and 1,1,2-trichloroethane. The criteria for these eight toxic substances were proposed in 1992 (24 N.J.R. 3983(a), November 2, 1992; 24 N.J.R. 4471(a); December 21, 1992) but not adopted (25 N.J.R. 5569(a), December 6, 1993). The Department is proposing criteria for these toxic substances that, upon adoption and USEPA approval will replace any corresponding criteria that the USEPA has promulgated for New Jersey. The basis of the criteria development is summarized in Table 5 Basis for Human Health Criteria Derivation.

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Additionally, New Jersey is under the NTR for polychlorinated biphenyls (PCBs) (64 Fed. Reg. 61182, November 9, 1999). The PCBs criteria proposed in 2001 were adopted by the Department and later approved by the USEPA in 2002. The USEPA has planned to withdraw New Jersey from the NTR for PCBs during the next round of withdrawals from the NTR. (Letter from W. Mugdan, Director, Division of Environmental Planning and Protection, USEPA, Region 2 to Geoffrey Grubbs, Director, USEPA Office of Science and Technology, Washington, DC, May 13, 2004). For this proposal the Department has revised these PCB criteria to reflect the currently recommended fish consumption rate. As they are based on the USEPA 2002 National Recommended Criteria, USEPA approval of the criteria is expected.

Additional Human Health Criteria: The Department is including additional criteria for other toxic substances to be regulated under the SWQS program because they are priority pollutants pursuant to Section 307(a)(1) of the Federal Clean Water Act and already monitored and reported as part of the NJPDES discharge monitoring data. The five new pollutants are acenaphthene, 2-chloronaphthalene, 1,2-dichloropropane, 2,4-dimethyl phenol, and N-Nitrosodimethylamine. Their criteria for consumption of water and organisms and criteria for consumption of organisms only established as NRWQC 2002 are being proposed as freshwater and saline criteria, respectively, for these pollutants in the proposed SWQS.

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Table 4. Chemical-Specific Surface Water Human Health Criteria

	Toxic Substances	CASRN	Existing SWQC		National Recommended WQC		Proposed SWQC	
			FW2 (µg/L)	SE, SC (µg/L)	Water & Organisms (µg/L)	Organisms only (µg/L)	FW2 (µg/L)	SE, SC (µg/L)
1	Acenaphthene	83-32-9			670	990	670	990
2	Acrolein	107-02-8	320	780	190	290	6.1	9.3
3	Acrylonitrile	107-13-1	0.0591	0.665	0.051	0.25	0.051	0.25
4	Aldrin	309-00-2	0.000135	0.000144	0.000049	0.000050	0.000049	0.000050
5	Anthracene	120-12-7	9,570	108,000	8,300	40,000	8,300	40,000
6	Antimony (Total)	7440-36-0	12.2	4,300	5.6	640	5.6	640
7	Arsenic (Total)	7440-38-2	0.0170	0.136	0.018	0.14	0.017	0.061
8	Asbestos	1332-21-4	7x10 ⁶ f/L >10µm(h)		7x10 ⁶ f/L >10µm(h)		7x10 ⁶ f/L >10µm(h)	
9	Barium	7440-39-3	2,000		1,000		2,000	
10	Benz(a)anthracene	56-55-3	0.0028	0.031	0.0038	0.018	0.038	0.18
11	Benzene	71-43-2	0.150	71	0.61-2.2	14-51	0.15	3.3
12	Benzidine	92-87-5	0.000118	0.000535	0.000086	0.00020	0.000086	0.00020
13	Benzo(a)pyrene (BaP)	50-32-8	0.0028	0.031	0.0038	0.018	0.0038	0.018
14	Benzo(b)fluoranthene (3,4-Benzofluoranthene)	205-99-2	0.0028	0.031	0.0038	0.018	0.038	0.18
15	Benzo(k)fluoranthene	207-08-9	0.0028	0.031	0.0038	0.018	0.38	1.8
16	Beryllium	7440-41-7					6.0	42
17	alpha-BHC (alpha-HCH)	319-84-6	0.00391	0.0131	0.0026	0.0049	0.0026	0.0049
18	beta-BHC (beta-HCH)	319-85-7	0.137	0.460	0.0091	0.017	0.0091	0.017
19	gamma-BHC (gamma-HCH/Lindane)	58-89-9	[0.19]	[0.63]	0.98	1.8	0.98	1.8
20	Bis(2-chloroethyl) ether (Dichloroethyl ether)	111-44-4	0.0311	1.4	0.030	0.53	0.030	0.53
21	Bis(2-chloroisopropyl) ether	108-60-1	1,250	170,000	1,400	65,000	1,400	65,000

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22	Bis(2-ethylhexyl) phthalate (DEHP)	117-81-7	1.76	5.92	1.2	2.2	1.2	2.2
23	Bromodichloromethane (Dichlorobromomethane)	75-27-4	0.266	22	0.55	17	0.55	17
24	Bromoform	75-25-2	4.38	360	4.3	140	4.3	140
25	Bromomethane (Methyl bromide)	74-83-9	48.4	4,000	47	1,500	47	1,500
26	Butylbenzyl phthalate	85-68-7	239	416	1,500	1,900	150	190
27	Cadmium	7440-43-9	10				3.4	16
28	Carbon tetrachloride	56-23-5	0.363	6.31	0.23	1.6	0.33	2.3
29	Chlordane	57-74-9	0.000277	0.000283	0.00080	0.00081	0.00010	0.00011
30	Chloride	16887-00-6	250,000 (ol)				250,000 (ol)	
31	Chlorobenzene (Monochlorobenzene)	108-90-7	22.0	21,000	130	1,600	210	2,500
32	Chloroform	67-66-3	5.67	470	5.7	470	68	2,100
33	2-Chloronaphthalene	91-58-7			1,000	1,600	1,000	1,600
34	2-Chlorophenol	95-57-8	122	402	81	150	81	150
35	Chromium (Total)	7440-47-3	160	3230			92	750
36	Chrysene	218-01-9	0.0028	0.031	0.0038	0.018	3.8	18
37	Copper	7440-50-8			1,300		1,300	
38	Cyanide, total	57-12-5	768	220,000	140	140	140	140
39	4,4'-DDD (p,p'-TDE)	72-54-8	0.000832	0.000837	0.00031	0.00031	0.00031	0.00031
40	4,4'-DDE	72-55-9	0.000588	0.000591	0.00022	0.00022	0.00022	0.00022
41	4,4'-DDT	50-29-3	0.000588	0.000591	0.00022	0.00022	0.00022	0.00022
42	Dibenz(a,h)anthracene	53-70-3	0.0028	0.031	0.0038	0.018	0.0038	0.018
43	Dibromochloromethane (Chlorodibromomethane)	124-48-1	72.6	[340]	0.40	13	0.40	13

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			FW2 (µg/L)	SE, SC (µg/L)	Water & Organisms (µg/L)	Organisms only (µg/L)	FW2 (µg/L)	SE, SC (µg/L)
44	Di-n-butyl phthalate	84-74-2	3,530	15,700	2,000	4,500	2,000	4,500
45	1,2-Dichlorobenzene (ortho)	95-50-1	2,520	16,500	420	1,300	2,000	6,200
46	1,3-Dichlorobenzene (meta)	541-73-1	2,620	22,200	320	960	2,200	8,300
47	1,4-Dichlorobenzene (para)	106-46-7	343	3,159	63	190	550	2,200
48	3,3-Dichlorobenzidine	91-94-1	0.0386	0.0767	0.021	0.028	0.021	0.028
49	1,2-Dichloroethane	107-06-2	0.291	99	0.38	37	0.29	28
50	1,1-Dichloroethylene (1,1-DCE)	75-35-4	4.81	[32]	330	7,100	4.7	100
51	1,2-Dichloroethylene (trans)	156-60-5	592		140	10,000	590	43,000
52	2,4-Dichlorophenol (DCP)	120-83-2	92.7	794	77	290	77	290
53	1,2-Dichloropropane	78-87-5			0.50	15	0.50	15
54	1,3-Dichloropropene (cis and trans)	542-75-6	0.193	1,700	0.34	21	0.34	21
55	Dieldrin	60-57-1	0.000135	0.000144	0.000052	0.000054	0.000052	0.000054
56	Diethyl phthalate	84-66-2	21,200	111,000	17,000	44,000	17,000	44,000
57	2,4-Dimethyl phenol	105-67-9			380	850	380	850
58	Dimethyl phthalate	131-11-3	313,000	2,900,000	270,000	1,100,000		
59	4,6-Dinitro-o-cresol (2-Methyl-4,6-dinitrophenol)	534-52-1	13.4	765	13	280	13	280
60	2,4-Dinitrophenol	51-28-5	69.7	14,000	69	5,300	69	5,300
61	2,4-Dinitrotoluene	121-14-2	0.11	9.1	0.11	3.4	0.11	3.4
62	1,2-Diphenylhydrazine	122-66-7	0.0405	0.541	0.036	0.20	0.036	0.20
63	Endosulfan (alpha and beta)	115-29-7	0.932	1.99			62	89
64	Endosulfan sulfate	1031-07-8	0.93	2.0	62	89	62	89
65	Endrin	72-20-8	0.629	0.678	0.059	0.060	0.059	0.060
66	Endrin aldehyde	7421-93-4	0.76	0.81	0.29	0.30	0.059	0.060
67	Ethylbenzene	100-41-4	3,030	27,900	530	2,100	530	2,100

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			FW2 (µg/L)	SE, SC (µg/L)	Water & Organisms (µg/L)	Organisms only (µg/L)	FW2 (µg/L)	SE, SC (µg/L)
68	Fluoranthene	206-44-0	310	393	130	140	130	140
69	Fluorene	86-73-7	1,340	[14,000]	1,100	5,300	1,100	5,300
70	Heptachlor	76-44-8	0.000208	0.000214	0.000079	0.000079	0.000079	0.000079
71	Heptachlor epoxide	1024-57-3	0.000103	0.000106	0.000039	0.000039	0.000039	0.000039
72	Hexachlorobenzene	118-74-1	0.000748	0.000775	0.00028	0.00029	0.00028	0.00029
73	Hexachlorobutadiene	87-68-3	6.94	[500]	0.44	18	0.44	18
74	Hexachlorocyclopentadiene	77-47-4	245	17,000	40	1,100	40	1,100
75	Hexachloroethane	67-72-1	2.73	12.4	1.4	3.3	1.4	3.3
76	Indeno(1,2,3-cd)pyrene	193-39-5	0.0028	0.031	0.0038	0.018	0.038	0.18
77	Isophorone	78-59-1	552	[6,000]	35	960	35	960
78	Lead (Total)	7439-92-1	5				5	
79	Manganese	7439-96-5		100	50	100		100
80	Mercury (Total)	7439-97-6	0.144	0.146	0.050	0.051	0.050	0.051
81	Methoxychlor	72-43-5	40		100		40	
82	Methyl tertiary-butyl ether (MTBE)	1634-04-4					70	
83	Methylene chloride	75-09-2	2.49	1,600	4.6	590	2.5	310
84	Nickel (Soluble salts)	7440-02-0	516	3,900	610	4,600	500	1,700
85	Nitrate	14797-55-8	10,000		10,000		10,000	
86	Nitrobenzene	98-95-3	16.0	1,900	17	690	17	690
87	N-Nitrosodi-n-butylamine	924-16-3	0.00641		0.0063	0.22	0.0063	0.22
88	N-Nitrosodiethylamine	55-18-5	0.000233		0.0008	1.24	0.00023	0.13
89	N-Nitrosodimethylamine	62-75-9	0.000686	8.1	0.00069	3.0	0.00069	3.0
90	N-Nitrosodiphenylamine	86-30-6	4.95	16.2	3.3	6.0	3.3	6.0
91	N-Nitrosodi-n-propylamine (Di-n-propylnitrosamine)	621-64-7			0.0050	0.51	0.0050	0.51

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92	N-Nitrosopyrrolidine	930-55-2	0.0167		0.016	34	0.016	34
93	PCBs (Polychlorinated biphenyls)	1336-36-3	[0.00017]	[0.00017]	0.000064	0.000064	0.000064	0.000064
94	Pentachlorobenzene	608-93-5	3.67	4.21	1.4	1.5	1.4	1.5
95	Pentachlorophenol	87-86-5	0.282	8.2	0.27	3.0	0.27	3.0
96	Phenol	108-95-2	20,900	4,600,000	21,000	1,700,000	10,000	860,000
97	Pyrene	129-00-0	797	8,970	830	4,000	830	4,000
98	Selenium (Total)	7782-49-2	10		170	4,200	170	4,200
99	Silver	7440-22-4	164				170	40,000
100	1,2,4,5-Tetrachlorobenzene	95-94-3	2.56	3.25	0.97	1.1	0.97	1.1
101	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	1746-01-6	0.000000013	0.000000014	0.0000000050	0.0000000051	0.0000000050	0.0000000051
102	1,1,2,2-Tetrachloroethane	79-34-5	1.72	[110]	0.17	4.0	4.7	110
103	Tetrachloroethylene (PCE)	127-18-4	0.388	4.29	0.69	3.3	0.34	1.6
104	Thallium	7440-28-0	1.70	6.22	0.24	0.47	0.24	0.47
105	Toluene	108-88-3	7,440	200,000	1,300	15,000	1,300	15,000
106	Toxaphene	8001-35-2	0.000730	0.000747	0.00028	0.00028	0.00028	0.00028
107	1,2,4-Trichlorobenzene	120-82-1	30.6	113	35	70	21	42
108	1,1,1-Trichloroethane	71-55-6	127				120	2,600
109	1,1,2-Trichloroethane	79-00-5	13.5	[420]	0.59	16	13	350
110	Trichloroethene (TCE) (Trichloroethylene)	79-01-6	1.09	81	2.5	30	1.0	12
111	2,4,5-Trichlorophenol	95-95-4	2,580	9,790	1,800	3,600	1,800	3,600
112	2,4,6-Trichlorophenol	88-06-2	2.14	6.53	1.4	2.4	0.58	1.0
113	Vinyl chloride	75-01-4	0.0830	525	0.025	2.4	0.082	8.1
114	Zinc	7440-66-6			7,400	26,000	7,400	26,000

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* Criteria listed are from NRWQC 2002 and 2003, except mercury criteria which are from NRWQC 1999.

Criteria in [] are NTR criteria which are CWA Section 304 (a) criteria promulgated by the USEPA for New Jersey through the National Toxics Rule (NTR) (57 Fed. Reg. 60911, December 22, 1992; 64 Fed. Reg. 61182, November 9, 1999).

The existing criteria for PCBs (equivalent to the NTR criteria) were adopted by the Department on January 22, 2002 (34 N.J.R. 537(a)) and approved by the USEPA. However, the PCBs criteria are still under NTR for New Jersey, pending USEPA withdrawal.

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Table 5. Basis for Human Health Criteria Derivation

Toxic Substances	CASRN	Proposed SWQC		Basis		Oral RfD (mg/kg-day)	Oral Slope Factor (mg/kg-day) ⁻¹	Carcinogen Group	Relative Source Contribution %	BCF (L/kg)	Equation to use	
		FW2 (µg/L)	SE, SC (µg/L)	FW2 (µg/L)	SE, SC (µg/L)						FW2 a,c,e	SE & SC b,d,f
1 Acenaphthene	83-32-9	670	990	NR02		0.06				242	c	d
2 Acrolein	107-02-8	6.1	9.3	IRIS		0.0005		^		215	c	d
3 Acrylonitrile	107-13-1	0.051	0.25	NR02			0.54	B1		30	a	b
4 Aldrin	309-00-2	0.000049	0.000050	NR02			17	B2		4,670	a	b
5 Anthracene	120-12-7	8,300	40,000	NR02		0.3		D		30	c	d
6 Antimony (Total)	7440-36-0	5.6	640	NR02		0.0004			40	1	c	d
7 Arsenic (Total)	7440-38-2	0.017	0.061	IRIS			1.5	A		44	a	b
8 Asbestos	1332-21-4	7,000,000 f/L >10 µm		NR02				A				
9 Barium	7440-39-3	2,000		NPDWR		0.07		D				
10 Benz(a)anthracene	56-55-3	0.038	0.18	RPF			0.73	B2		30	a	b
11 Benzene	71-43-2	0.15	3.3	NJDWQI			0.23	A		5.2	a	b
12 Benzidine	92-87-5	0.000086	0.00020	NR02			230	A		87.5	a	b
13 Benzo(a)pyrene (BaP)	50-32-8	0.0038	0.018	NR02/RPF			7.3	B2		30	a	b
14 Benzo(b)fluoranthene (3,4-Benzofluoranthene)	205-99-2	0.038	0.18	RPF			0.73	B2		30	a	b
15 Benzo(k)fluoranthene	207-08-9	0.38	1.8	RPF			0.073	B2		30	a	b
16 Beryllium	7440-41-7	6.0	42	IRIS		0.002		C		19	e	f
17 alpha-BHC- (alpha-HCH)	319-84-6	0.0026	0.0049	NR02			6.3	B2		130	a	b
18 beta-BHC (beta-HCH)	319-85-7	0.0091	0.017	NR02			1.8	C		130	a	b
19 gamma-BHC (gamma-HCH/Lindane)	58-89-9	0.98	1.8	NR03		0.0003			20	130	c	d
20 Bis(2-chloroethyl) ether (Dichloroethyl ether)	111-44-4	0.030	0.53	NR02			1.1	B2		6.9	a	b
21 Bis(2-chloroisopropyl) ether	108-60-1	1,400	65,000	NR02		0.04				2.47	c	d
22 Bis(2-ethylhexyl) phthalate (DEHP)	117-81-7	1.2	2.2	NR02			0.014	B2		130	a	b
23 Bromodichloromethane (Dichlorobromomethane)	75-27-4	0.55	17	NR02			0.062	B2		3.75	a	b
24 Bromoform	75-25-2	4.3	140	NR02			0.0079	B2		3.75	a	b

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		FW2 (µg/L)	SE, SC (µg/L)	FW2 (µg/L)	SE, SC (µg/L)						FW2 a,c,e	SE & SC b,d,f
25 Bromomethane (Methyl bromide)	74-83-9	47	1,500	NR02		0.0014		D		3.75	c	d
26 Butylbenzyl phthalate	85-68-7	150	190	Group C Policy IRIS		0.2		C	25	414	e	f
27 Cadmium	7440-43-9	3.4	16			0.0005(w) 0.001(f)				64	c+	d
28 Carbon tetrachloride	56-23-5	0.33	2.3	NJDWQI			0.091	B2		18.75	a	b
29 Chlordane	57-74-9	0.00010	0.00011	NJDWQI			2.7	B2		14,100	a	b
30 Chloride	16887-00-6	250,000(ol)		Red Book								
31 Chlorobenzene (Monochlorobenzene)	108-90-7	210	2,500	NJDWQI		0.0065		D		10.3	c	d
32 Chloroform	67-66-3	68	2,100	IRIS		0.01		B2	20	3.75	c	d
33 2-Chloronaphthalene	91-58-7	1,000	1,600	NR02		0.08				202	c	d
34 2-Chlorophenol	95-57-8	81	150	NR02		0.005				134	c	d
35 Chromium (Total)	7440-47-3	92	750	IRIS		0.003		D		16	c	d
36 Chrysene	218-01-9	3.8	18	RPF			0.0073	B2		30	a	b
37 Copper	7440-50-8	1,300		NR02				D				
38 Cyanide, total	57-12-5	140	140	NR03		0.02		D	20	1	c	d
39 4,4'-DDD (p,p'-TDE)	72-54-8	0.00031	0.00031	NR02			0.24	B2		53,600	a	b
40 4,4'-DDE	72-55-9	0.00022	0.00022	NR02			0.34	B2		53,600	a	b
41 4,4'-DDT	50-29-3	0.00022	0.00022	NR02			0.34	B2		53,600	a	b
42 Dibenz(a,h)anthracene	53-70-3	0.0038	0.018	RPF			7.3	B2		30	a	b
43 Dibromochloromethane (Chlorodibromomethane)	124-48-1	0.40	13	NR02			0.084	C		3.75	a	b
44 Di-n-butyl phthalate	84-74-2	2,000	4,500	NR02		0.1		D		89	c	d
45 1,2-Dichlorobenzene (ortho)	95-50-1	2,000	6,200	NJDWQI		0.086		D		55.6	c	d
46 1,3-Dichlorobenzene (meta)	541-73-1	2,200	8,300	NJDWQI		0.086		D		41.2	c	d
47 1,4-Dichlorobenzene (para)	106-46-7	550	2,200	NJDWQI		0.21		C		37.5	e	f
48 3,3-Dichlorobenzidine	91-94-1	0.021	0.028	NR02			0.45	B2		312	a	b
49 1,2-Dichloroethane	107-06-2	0.29	28	NJDWQI			0.12	B2		1.2	a	b
50 1,1-Dichloroethylene (1,1-DCE)	75-35-4	4.7	100	NJDWQI		0.0014		C		5.61	e	f

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		FW2 (µg/L)	SE, SC (µg/L)	FW2 (µg/L)	SE, SC (µg/L)						FW2 a,c,e	SE & SC b,d,f
51 1,2-Dichloroethylene (trans)	156-60-5	590	43,000	NJDWQI		0.017				1.58	c	d
52 2,4-Dichlorophenol (DCP)	120-83-2	77	290	NR02		0.003				40.7	c	d
53 1,2-Dichloropropane	78-87-5	0.50	15	NR02			0.067	B2		4.1	a	b
54 1,3-Dichloropropene (cis and trans)	542-75-6	0.34	21	NR03			0.1	B2		1.9	a	b
55 Dieldrin	60-57-1	0.000052	0.000054	NR02			16	B2		4,670	a	b
56 Diethyl phthalate	84-66-2	17,000	44,000	NR02		0.8		D		73	c	d
57 2,4-Dimethyl phenol	105-67-9	380	850	NR02		0.02				93.8	c	d
58 Dimethyl phthalate	131-11-3			IRIS				D				
59 4,6-Dinitro-o-cresol (2-Methyl-4,6-dinitrophenol)	534-52-1	13	280	NR02		0.00039				5.5	c	d
60 2,4-Dinitrophenol	51-28-5	69	5,300	NR02		0.002				1.5	c	d
61 2,4-Dinitrotoluene	121-14-2	0.11	3.4	NR02			0.311			3.8	a	b
62 1,2-Diphenylhydrazine	122-66-7	0.036	0.20	NR02			0.8	B2		24.9	a	b
63 Endosulfan (alpha and beta)	115-29-7	62	89	IRIS		0.006				270	c	d
64 Endosulfan sulfate	1031-07-8	62	89	NR02		0.006				270	c	d
65 Endrin	72-20-8	0.059	0.060	NR03		0.0003		D	20	3970	c	d
66 Endrin aldehyde	7421-93-4	0.059	0.060	Endrin								
67 Ethylbenzene	100-41-4	530	2,100	NR03		0.1		D	20	37.5	c	d
68 Fluoranthene	206-44-0	130	140	NR02		0.04		D		1,150	c	d
69 Fluorene	86-73-7	1,100	5,300	NR02		0.04		D		30	c	d
70 Heptachlor	76-44-8	0.000079	0.000079	NR02			4.5	B2		11,200	a	b
71 Heptachlor epoxide	1024-57-3	0.000039	0.000039	NR02			9.1	B2		11,200	a	b
72 Hexachlorobenzene	118-74-1	0.00028	0.00029	NR02			1.6	B2		8,690	a	b
73 Hexachlorobutadiene	87-68-3	0.44	18	NR02			0.078	C		2.78	a	b
74 Hexachlorocyclopentadiene	77-47-4	40	1,100	NR03		0.006		D	20	4.34	c	d
75 Hexachloroethane	67-72-1	1.4	3.3	NR02			0.014	C		86.9	a	b
76 Indeno(1,2,3-cd)pyrene	193-39-5	0.038	0.18	RPF			0.73	B2		30	a	b
77 Isophorone	78-59-1	35	960	NR02			0.00095	C		4.38	a	b
78 Lead (Total)	7439-92-1	5		*				B2				

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		FW2 (µg/L)	SE, SC (µg/L)	FW2 (µg/L)	SE, SC (µg/L)						FW2 a,c,e	SE & SC b,d,f
79 Manganese	7439-96-5		100		NR02							
80 Mercury (Total)	7439-97-6	0.050	0.051		NR99							
81 Methoxychlor	72-43-5	40			NPDWR							
82 Methyl tertiary-butyl ether (MTBE)	1634-04-4	70			NJDWQI	0.1		C	20	0.4#		
83 Methylene chloride	75-09-2	2.5	310		NJDWQI		0.014	B2		0.91	a	b
84 Nickel (Soluble salts)	Various	500	1,700		*	0.02				47	c	d
85 Nitrate	14797-55-8	10,000			NR02	1.6						
86 Nitrobenzene	98-95-3	17	690		NR02	0.0005		D		2.89	c	d
87 N-Nitrosodi-n-butylamine	924-16-3	0.0063	0.22		NR02		5.43	B2		3.38	a	b
88 N-Nitrosodiethylamine	55-18-5	0.00023	0.13		IRIS		150	B2		0.2	a	b
89 N-Nitrosodimethylamine	62-75-9	0.00069	3.0		NR02		51	B2		0.026	a	b
90 N-Nitrosodiphenylamine	86-30-6	3.3	6.0		NR02		0.0049	B2		136	a	b
91 N-Nitrosodi-n-propylamine (Di- n-propylnitrosamine)	621-64-7	0.0050	0.51		NR02		7.0	B2		1.13	a	b
92 N-Nitrosopyrrolidine	930-55-2	0.016	34		NR02		2.13	B2		0.055	a	b
93 PCBs (Polychlorinated biphenyls)	1336-36-3	0.000064	0.000064		NR02		2.0	B2		31,200	a	b
94 Pentachlorobenzene	608-93-5	1.4	1.5		NR02	0.0008		D		2,125	c	d
95 Pentachlorophenol	87-86-5	0.27	3.0		NR02		0.12	B2		11	a	b
96 Phenol	108-95-2	10,000	860,000		IRIS	0.3		D		1.4	c	d
97 Pyrene	129-00-0	830	4,000		NR02	0.03		D		30	c	d
98 Selenium (Total)	7782-49-2	170	4,200		NR02	0.005		D		4.8	c	d
99 Silver	7440-22-4	170	40,000		IRIS	0.005		D		0.5	c	d
100 1,2,4,5-Tetrachlorobenzene	95-94-3	0.97	1.1		NR02	0.0003				1,125	c	d
101 2,3,7,8-Tetrachlorodibenzo-p- dioxin (TCDD)	1746-01-6	0.0000000050	0.0000000051		NR02		156000	B2		5,000	a	b
102 1,1,2,2-Tetrachloroethane	79-34-5	4.7	110		NJDWQI	0.0014		C		5	e	f
103 Tetrachloroethylene (PCE)	127-18-4	0.34	1.6		NJDWQI		0.082	B2		30.6	a	b
104 Thallium	7440-28-0	0.24	0.47		NR03	0.000068		D	20	116	c	d

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		FW2 (µg/L)	SE, SC (µg/L)	FW2 (µg/L)	SE, SC (µg/L)						FW2 a,c,e	SE & SC b,d,f
105 Toluene	108-88-3	1,300	15,000	NR03		0.2		D	20	10.7	c	d
106 Toxaphene	8001-35-2	0.00028	0.00028	NR02			1.1	B2		13,100	a	b
107 1,2,4-Trichlorobenzene	120-82-1	21	42	NJDWQI		0.0012		D		114	c	d
108 1,1,1-Trichloroethane	71-55-6	120	2,600	NJDWQI		0.0037		D		5.6	c	d
109 1,1,2-Trichloroethane	79-00-5	13	350	NJDWQI		0.0039		C		4.5	e	f
110 Trichloroethene (TCE) (Trichloroethylene)	79-01-6	1.0	12	NJDWQI			0.031	B2		10.6	a	b
111 2,4,5-Trichlorophenol	95-95-4	1,800	3,600	NR02		0.1				110	c	d
112 2,4,6-Trichlorophenol	88-06-2	0.58	1.0	NJDWQI			0.026	B2		150	a	b
113 Vinyl chloride	75-01-4	0.082	8.1	NJDWQI			0.42	A		1.17	a	b
114 Zinc	7440-66-6	7,400	26,000	NR02		0.3		D		47	c	d

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Equations used for criteria calculation:

To develop carcinogenic-based criteria, corresponding to a lifetime incremental cancer risk of 10^{-6} :

Equation a Freshwaters Criterion = $(0.000001/\text{Oral Slope Factor (mg/kg-day)}^{-1}) * 70 \text{ kg} * 1000 (\mu\text{g/mg}) / (2 \text{ L/day} + (0.0175 \text{ kg/day} * \text{BCF (L/kg)}))$

Equation b Saline Criterion = $(0.000001/\text{Oral Slope Factor (mg/kg-day)}^{-1}) * 70 \text{ kg} * 1000 (\mu\text{g/mg}) / (0.0175 \text{ kg/day} * \text{BCF (L/kg)})$

To develop non-carcinogenic-based criteria:

Equation c Freshwater Criterion = $\text{RfD (mg/kg-day)} * \text{RSC} * 70 \text{ kg} * 1000 (\mu\text{g/mg}) / (2 \text{ L/day} + (0.0175 \text{ kg/day} * \text{BCF (L/kg)}))$

Equation d Saline Criterion = $\text{RfD (mg/kg-day)} * \text{RSC} * 70 \text{ kg} * 1000 (\mu\text{g/mg}) / (0.0175 \text{ kg/day} * \text{BCF (L/kg)})$

To develop non-carcinogenic-based criteria with an additional uncertainty factor of 10:

Equation e Freshwater Criterion = $[\text{RfD (mg/kg-day)} * \text{RSC} * 70 \text{ kg} * 1000 (\mu\text{g/mg}) / (2 \text{ L/day} + (0.0175 \text{ kg/day} * \text{BCF (L/kg)}))] / 10$

Equation f Saline Criterion = $[\text{RfD (mg/kg-day)} * \text{RSC} * 70 \text{ kg} * 1000 (\mu\text{g/mg}) / (0.0175 \text{ kg/day} * \text{BCF (L/kg)})] / 10$

Abbreviations

kg = kilograms

L = liter

mg = milligrams

ol = organoleptic

μg = micrograms

f = fibers

μm = micrometers

Acronyms

IRIS = USEPA Integrated Risk Information System

NJDWQI = New Jersey Drinking Water Quality Institute

NPDWR = National Primary Drinking Water Regulations (CFR-Part 141)

NR99 = National Recommended Water Quality Criterion – Correction, April 1999, EPA 822-Z-99-001

NR02 = National Recommended Water Quality Criteria: 2002

NR03 = National Recommended Water Quality Criteria for the Protection of Human Health (68 Fed. Reg. 75507, December 31, 2003)

RPF = Relative Potency Factor

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Footnotes

- ^ The carcinogen group assigned to acrolein in IRIS is the descriptor, “data are inadequate for an assessment of human carcinogenic potential” which is equivalent to Group D.
- + See text on cadmium. For RfD for cadmium, “(w)” stands for water. “(f)” stands for food.
- # The BCF for MTBE was derived from its octanol-water partition coefficient of 1.05 (New Jersey Drinking Water Quality Institute. Maximum Contaminant Level Recommendations for Hazardous Contaminants in Drinking Water. September 26, 1994. Appendix A, Health-Based Maximum Contaminant Level Support Documents and Addenda. p. A-32) based on the equations given in the USEPA's *Draft Water Quality Criteria Methodology: Human Health*. EPA 822-Z-98-001. August 1998.
- * The criterion for lead remains unchanged. The criteria for nickel are based on data from 2002 Calculation Matrix updated by the current fish consumption rate of 17.5 g/day.

Explanatory notes

Criteria excluding criteria for asbestos, cadmium, lead, MTBE (see text) and those based on NPDWR were derived according to standard methodology from the equations listed above using information noted below and exposure parameters specified by the USEPA. For fish consumption rate, the updated national default rate of 17.5 g/day was used, except as noted.

The toxicity information (Oral RfD or Oral Slope Factor) is as cited in the respective basis listed in the Table, i.e., IRIS, NJDWQI, NPDWR, NR99, NR02, NR03, or RPF. Information on Carcinogen Group is obtained from IRIS, except for NJDWQI chemicals.

IRIS values reflect information through February 1, 2005. Slope factor and carcinogen group of arsenic are those listed in IRIS under arsenic (inorganic); RfDs of chromium, and nickel are those listed in IRIS under chromium (VI) and nickel (soluble salts), respectively. The RfD for thallium was developed by the Department based on the RfD of thallium (I) sulfate in IRIS.

For criteria based on NJDWQI, the oral RfD or slope factor and carcinogen group equivalent to USEPA categorization were developed pursuant to the requirements of NJSDWA (N.J.S.A. 58:12A-1 et seq.). Criteria are the health-based levels cited in the New Jersey Drinking Water Quality Institute (NJDWQI) documents, *Maximum Contaminant Level Recommendations for Hazardous Contaminants in Drinking Water, Appendix B, Health-Based Maximum Contaminant Level Support Documents*, March 26, 1987, submitted to New Jersey Department of Environmental Protection, and in *Maximum Contaminant Level Recommendations for Hazardous Contaminants in Drinking Water, Appendix A, Health-Based Maximum Contaminant Level Support*

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Documents and Addenda, September 26, 1994, (<http://www.nj.gov/dep/watersupply>) submitted to State of New Jersey, Department of Environmental Protection.

Criteria based on NPDWR are the Maximum Contaminant Level Goals from the USEPA 2004 Edition of the *Drinking Water Standards and Health Advisories*, EPA 822-R-04-005, Winter 2004.

NR99 are based on IRIS toxicity data as of April 8, 1998.

NR02 and NR03 are based on IRIS toxicity data as of May 17, 2002.

RPFs are applicable to Group B2 PAHs. The slope factors of these PAHs were derived from the IRIS slope factor of B(a)P of 7.3 (mg/kg-day)⁻¹ multiplied by the relative potency estimate for the individual PAH recommended in the USEPA “*Provisional Guidance for Quantitative Risk Assessment of Polycyclic Aromatic Hydrocarbons*”, EPA/600/R-93/089. The relative potencies based on that of benzo(a)pyrene as 1.0 are as follows: benz(a)anthracene, 0.1; benzo(b)fluoranthene, 0.1; benzo(k)fluoranthene, 0.01; chrysene, 0.001; dibenz(a,h)anthracene, 1.0; and indeno(1,2,3-c,d)pyrene, 0.1.

Carcinogenic Group: Unless otherwise noted carcinogenic-based criteria were developed for Groups A and B carcinogens, using the carcinogenic equations and slope factors to correspond to lifetime incremental cancer risk of 10⁻⁶. Non-carcinogenic-based criteria were developed for pollutants categorized as Groups D or E and for those with no categorization indicated, using the non-carcinogenic equations and RfDs and in some cases modified by the relative source contribution. The new approach for Group C carcinogens stipulates that criteria be developed through the use of a slope factor at a 10⁻⁶ incremental cancer risk level, if such a slope factor is judged by the Department to be technically sound and based on adequate toxicological data. If such a slope factor is not available, the risk assessment will be based on non-carcinogenic effects using the RfD with an additional uncertainty factor of 10 to protect from possible carcinogenic effects. This new approach was used for pollutants identified as Group C except for the NJDWQI pollutants where non-carcinogenic criteria were developed preferentially.

Relative Source Contribution (RSC) for non-carcinogens is not included in the criteria derivation, unless documented by the USEPA in NR02 or NR03. In such cases, specific percentage is shown in the Table.

Bioconcentration Factor (BCF) from the 1980 USEPA ambient water quality criteria documents was retained unless otherwise noted. These BCFs were used by the USEPA in promulgating human health criteria for priority toxic pollutants in the 1992 National Toxics Rule and subsequent updates of water quality criteria as in NR99, NR02 and NR03.

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N.J.A.C. 7:9B-1.14(g) The Department is proposing criteria applicable to site-specific conditions within New Jersey at this section. The New York / New Jersey harbor specific saline copper criteria is the only criteria for listed at this time.

N.J.A.C. 7:9B-1.14(h) The Department is proposing to recodify the existing provision N.J.A.C. 7:9B-1.14(d), regarding surface water quality criteria for waters under the jurisdiction of the Delaware River Basin Commission to N.J.A.C. 7:9B-1.14(h). No amendments are being proposed to the text.

N.J.A.C. 7:9B-1.15, Surface water classifications for the waters of the State of New Jersey, contains waterbody classification listings, arranged by major drainage basin, and instructions for use of the classification tables.

N.J.A.C. 7:9B-1.15(b): The Department proposing to correct a mistake at N.J.A.C. 7:9B-1.15(b)liii. The Department is replacing "Hudson" with "Hackensack" because the listing should correctly read "the Passaic River, Hackensack River and New York Harbor Complex drainage basin which contains the surface waters listed in Table 3 in (e) below" to match the title of Table 3.

N.J.A.C. 7:9B-1.15(c): The Department is proposing to delete the SC classification for waters in Island Beach State Park under the Barnegat Bay listing. All waters of Island Beach State Park that are not classified as FW1 are currently listed as FW2-NT/SE1/SC(C1). The SC classification applies to surface waters of the coast or the coastal waters. Therefore, the Department is proposing to delete the SC classification applicable to the in-land waters of the Island Beach State Park. If the proposed change is adopted, all waters of Island Beach State Park that are not classified as FW1 will be classified as FW2-NT/SE1(C1).

Brigantine National Wildlife Refuge was renamed as Edwin B. Forsythe National Wildlife Refuge in 1984. The Department is proposing to make this change in the Atlantic

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Coastal Basin classification table Brigantine and Great Bay waterbodies as part of this rulemaking.

N.J.A.C. 7:9B-1.15(d) and (h): In accordance with Executive Order 22, dated July 24, 2002, the Lebanon State Forest has been renamed to Brendan T. Byrne State Forest. Therefore, a change of name from Lebanon State Forest to Brendan T. Byrne State Forest is being proposed in the classification tables at N.J.A.C. 7:9B-1.15(d) and N.J.A.C. 7:9B-1.15(h) where appropriate.

The Department is also proposing to amend the listing of Jade Run to include the entire length, to reflect the listing in Table 6 of the classification tables at N.J.A.C. 7:9B-1.15(h) that identifies all the FW1 waters within the State.

In addition, the Department is proposing amendments to Tributaries of Paulins Kill at N.J.A.C. 7:9B-1.15(d) based on the fish sampling data (for more details see Trout Classifications below).

N.J.A.C. 7:9B-1.15(e): The Department is proposing to upgrade Beech Brook including all tributaries from FW2-TM to FW2-TP(C1) (for more details see Trout Classifications below).

The Department is proposing to delete the stream classification for Kikeout Brook because Kikeout Brook and Stone House Brook are two different names identified for the same waterbody and the same FW2-NT classification. Therefore, to eliminate confusion, the Department is proposing to delete the classification for Kikeout Brook and add "see Stone House Brook" where Kikeout Brook is listed. In addition, as part of this rulemaking a portion of the Stone House Brook is being proposed as trout production waters (for more details see Trout Classifications below).

The Department is proposing to upgrade a portion of Saddle River from FW2-TM to FW2-TP(C1) (for more details see Trout Classifications below).

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The Department is proposing to rearrange the listings under Wanaque River. The listing under Hewitt refers to the tributary south of Jennings Creek and therefore, should be properly listed under tributaries to Wanaque River. Therefore, the Department is proposing the deletion of the listing under Hewitt Wanaque River and relocating the same under the tributary to Wanaque River as shown in the proposed rule text at N.J.A.C. 7:9B-1.15(e). However, the classification of the tributary south of Jennings Creek remains the same as FW2-TP(C1). A portion of the Wanaque River is also being upgraded to a trout production classification based on the fish sampling data (for more details see Trout Classifications below).

N.J.A.C. 7:9B-1.15(f): The Department is proposing a minor editorial change under the listing of Town Neck Creek.

N.J.A.C. 7:9B-1.15(g): The Department is proposing to add a listing 'Cedar Swamp - See Rutgers Creek.' Cedar Swamp is a FW1 waterbody, which is currently listed under "Rutgers Creek". The proposed amendment should clarify any existing ambiguities.

The first tributary to Franklin Pond Creek was classified as FW1(tm) in the 1985 amendments to the Surface Water Quality Standards (17 N.J.R. 1270, May 20, 1985). However, the trout maintenance section was inadvertently deleted following the 1985 amendments. Therefore, the Department is proposing to include the trout maintenance classification to the first tributary to Franklin Pond Creek that will now read as FW1(tm).

In addition, the first tributary to Franklin Pond Creek, which is classified as FW1(tm) and located entirely within the Hamburg Mountain Wildlife Management Area, (flowing toward the Wallkill River), was mistakenly listed as a tributary of the Wallkill River in 1993 (See 25 N.J.R. 405(a)). To rectify the mistake, the Department adopted the same listing of the first tributary to Franklin Pond Creek under Franklin Pond Creek in May 2003 (See 35 N.J.R. 2264(b)). As a result, the Franklin Pond Creek listing was duplicated at N.J.A.C. 7:9B-1.15(g) Table 5 (Wallkill River Basin). The Table 6 listing of FW1 waters at N.J.A.C. 7:9B-1.15(h) describes the tributary

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as part of the Franklin Pond Creek and not as part of the Wallkill River. Therefore, as part of this proposal, the Department is proposing to delete the listing under the tributaries of Wallkill River.

Trout classifications

The Department is proposing to reclassify five stream segments, or a total of approximately 12 river miles, based on trout sampling data as shown in Table 6. Four stream segments (Beech Brook, Stone House Brook, Saddle River, and Wanaque River) support trout production use designation. Therefore, the Department is proposing that these segments will additionally receive a Category One antidegradation designation. The Department is also proposing several amendments clarifying the names of State Forests, classification listings and editorial changes as explained below.

The waterbodies for which trout-related reclassifications are being proposed are listed in Table 6 below. Stream sampling (fish survey) data are used by the Department to determine whether a waterway should be classified to protect the trout production (TP) or trout maintenance (TM) uses. When waterbodies are surveyed and found to have naturally reproduced trout in their first year of life (young of the year or YOY), they are classified as trout production waters or FW2-TP. When adult trout are found in a waterbody, and YOY trout are absent, the classification of the stream as trout maintenance (FW2-TM) or nontrout (FW2-NT) depends upon the stream's total fish population.

A classification system was developed which utilizes a table of Incidence of Occurrence (I.O.), of other fish species associated with trout, based on data from a statewide survey of freshwater streams. A value of 100% was assigned to each trout species found during the survey. Other nontrout species were assigned an I.O. value based on the percentage of the time that the individual species was found in the presence of trout. A figure of 20% was selected by the Department's Bureau of Freshwater Fisheries as the minimum occurrence with trout that would classify a species as being trout "associated." This 20% figure was also selected as the cutoff figure for determining whether a stream should be classified as FW2-TM. The individual

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percentage figures for an individual stream are added and averaged, with the resulting value serving as the basis for the classification. If the average I.O. value is greater than 20%, the stream segment would be classified as trout maintenance, if the average I.O. value is less than 20%, the stream segment would be classified as nontrout.

Based on this methodology the Department is proposing to reclassify the following waterbodies, or portions thereof, as listed in the following table:

Table 6. PROPOSED CHANGES TO THE STREAM CLASSIFICATIONS AS A RESULT OF STREAM SURVEYS CONDUCTED IN 2003 and 2004

Waterbody	Current classification ^①	Proposed classification	Young of the year (trout species)	I.O. ^②	River miles
Delaware River Basin					
Paulinskill River trib. (E. of Hainsburg Station) - Entire length	Not listed	FW2-TM	N/A	26.6	1.26
Paulinskill River trib. (E. of Vail) - Source downstream to confluence with outlet stream of Lake Susquehanna	Not listed	FW2-TM	N/A	31.4	1.8
Passaic, Hackensack, and New York Harbor Complex Basin					
Beech Brook (West Milford Township) - Entire length, including all tributaries	FW2-TM	FW2-TP(C1)	Brook trout	N/A	3.2
Stone House Brook (Butler) - Valley Road bridge downstream to confluence with Pequannock River	FW2-NT	FW2-TP(C1)	Brown trout	N/A	0.85
Saddle River (Upper Saddle River) - Bergen County Rt. 2 (Lake Street) bridge downstream to confluence with Pleasant Brook, including all tributaries	FW2-TM	FW2-TP(C1)	Brown trout	N/A	2.6
Wanaque River (Pompton Lakes) - Wanaque Reservoir dam to Wanaque Ave. bridge including unnamed tributaries	FW2-NT	FW2-TP(C1)	Brown trout	N/A	5.2

① Brackets indicate that the waterbody was not previously identified, although the classification was determined pursuant to N.J.A.C. 7:9B-1.15(b).

② Incidence of Occurrence (values more than 20 are indicative of a TM classification and less than 20 are indicative of NT classification).

Social Impact

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The proposed re-adoption of N.J.A.C. 7:9B with amendments will allow the Department to continue to protect the surface waters of the State and will, therefore, result in a positive social impact. Without the SWQS, the Department would not have regulations directly governing the protection and enhancement of surface water quality and resources. The maintenance of high quality water resources is important to all, particularly to the many communities which depend upon surface waters for public, industrial, and agricultural water supplies, recreation, tourism, fishing, and shellfish harvesting. Further, the State of New Jersey may not retain delegated jurisdiction over the federal NPDES permitting program in this State in the absence of adopted SWQS.

The proposed amendments to the antidegradation policies are intended to improve implementation of the Surface Water Quality Standards by providing flexibility for existing discharges while continuing to protect and maintain water quality. In conjunction with the water quality planning and NJPDES programs, the SWQS rules will allow the Department to maintain or enhance water quality where the surface water quality standards are met, and restore those waters that do not meet the surface water quality standards. The antidegradation policies will discourage development where it would impair or destroy natural resources and the environmental qualities vital to the health and wellbeing of the citizens of New Jersey.

The proposed amendments to the water quality criteria for aquatic life-based and human health protection will enable the Department to issue NJPDES permits with WQBELs based on the updated criteria. Because the updated criteria reflect the current science, these amendments will result in positive social impact. The proposed changes to the bacterial quality criteria that are based on USEPA's most recent science will also result in a positive social impact by ensuring that the best indicators to protect public health are used. The proposed temperature criteria for trout production waters will protect trout and trout-associated species. In addition to protecting the resource, this will also produce a positive social impact to the fishing industry, which relies on these species.

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The proposed amendments to the stream classifications and antidegradation designations will allow the Department to provide more appropriate protection to the affected waterbodies and will therefore, result in a positive social impact. The maintenance of water quality resources is important to all residents, particularly to the many communities that depend upon surface waters for public, industrial, and agricultural water supplies, recreation, tourism, and fishing.

Economic Impact

The proposed re-adoption with amendments will produce a variety of economic impacts, ranging from no economic impact, to potentially significant impact. The magnitude of the economic impacts will be determined, in part, by the activity, the severity of the site-specific conditions and the approaches chosen to comply with the SWQS. The Surface Water Quality Standards allow for flexibility in the methods utilized to achieve water quality goals to allow the regulated community to choose compliance measures that reduce economic impacts while assuring that the State's waters are protected.

Antidegradation:

The Water Quality Planning Act, N.J.S.A. 58:11A-1 *et seq.*, and the Water Pollution Control Act, N.J.S.A. 58:10A-1 *et seq.*, require the State to maintain water quality in existing high quality waters and restore impaired waters. The Department does this by developing and implementing the antidegradation policies within the Surface Water Quality Standards. The Department establishes stream classifications and an antidegradation designation for each waterbody.

As indicated in the summary, there is significant overlap between the goals and objectives of the State Planning Act and the goals and objectives of the Water Quality Planning Act. Both statutes contain policies designed to protect water quality and conserve natural resources in the context of a Statewide planning framework. The Department has incorporate by reference the Planning Areas and Designated Centers in the State Plan in the Department's antidegradation implementation policies. In this way the Department appropriately and closely coordinates the allowance of lower water quality associated with development with the overall

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planning objectives articulated in the State Plan. These antidegradation implementation policies strike the appropriate balance between the need to provide sufficient protection of water resources with the need to promote growth where it is most appropriate based on infrastructure investments and other planning considerations.

New Jersey has three levels of antidegradation protection in its Surface Water Quality Standards. The highest tier, which includes FW1 and Pinelands (PL) waters, is assigned to waterbodies that qualify as Outstanding National Resource Waters (ONRW). The next tier is Category One waters, which are protected from calculable changes in water quality. All other waters are designated as Category Two waters, where a lowering in water quality may be allowed for important social and economic development, provided water quality criteria continue to be met.

The degree of economic impact of these antidegradation policies is highly dependent upon the location of the proposed activity. No new or expanded discharges or developments that might impact FW1 waters may be approved by the Department. The Department does not expect any economic impact from the continued designation of waters as FW1, as these streams flow within State-owned lands. New and expanded discharges and developments which may impact upon waters classified as PL must be consistent with the Pinelands Comprehensive Management Plan (N.J.S.A. 13:18A-1 *et seq.*). The Department expects that some economic impact will occur but these impacts have been addressed in the development of the Pinelands Comprehensive Management Plan.

In Category One waters, discharges and development are allowed, but are restricted to those that do not result in a lowering of water quality. In Category Two waters, the goal is to maintain existing water quality, but a lowering may be permitted if it is necessary to support important social and economic development. The antidegradation policies in these rules are not expected to have an economic impact existing dischargers and existing development in Category One or Category Two waters that do not propose to expand.

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The proposed new antidegradation provision at N.J.A.C. 7:9B-1.5(d)3 includes a list of activities that are not subject to antidegradation review. Applicants proposing any of these activities are not subject to an antidegradation review and will not incur any additional cost from these rules.

NJPDES Point Source Implementation: The Department has proposed a new N.J.A.C. 7:9B-1.5(d)4 to clarify the requirements for point sources regulated by the NJPDES permit program. Several NJPDES permitting actions are exempt from an antidegradation review. These include NJPDES permit renewals that do not authorize an increase in permitted flow or pollutant loading, discharges authorized by a general permit issued in accordance with N.J.A.C. 7:14A-6.13, and NJPDES permits issued to industrial facilities with production-based effluent limits that are less than or equal to previously authorized pollutant limits. Applicants proposing any of these activities are not subject to an antidegradation review and will not incur any additional cost as a result of the re-adoption with amendments.

All other NJPDES regulated wastewater discharges are considered new and expanded activities which are subject to antidegradation requirements. For new and expanded NJPDES dischargers, the economic impact may vary depending upon discharge location, pollutants of concern and treatment options as discussed below. Applicants proposing a new or expanded discharge must conduct an alternatives analysis to determine whether a calculable change in water quality is necessary. The applicant may need to hire an environmental consultant to prepare an alternatives analysis, engineering services to evaluate treatment options and, in some cases, contract for laboratory analysis.

If the Department determines that a new or expanded surface water discharge is necessary, the applicant will be required to initiate a water quality monitoring program to determine existing water quality for all pollutants of concern. The cost of this monitoring effort will depend on the location of the discharge, as well as the number and type of pollutants that must be monitored, the need to contract for laboratory analysis, and to hire an environmental consultant to prepare a report for the applicant.

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In Category One waters or in Category Two waters located in the preservation area of the Highlands Water Protection and Planning Act (N.J.S.A. 13:20-1 *et seq.*) as specified at N.J.A.C. 7:9B-1.5(d)6, the Department will impose water quality effluent limitations necessary to maintain the in-stream water quality based upon the volume of wastewater flow generated, the available dilution, existing water quality, and projected effluent quality. In order to protect the State's water quality, very stringent permit limitations may be imposed. The applicant is responsible for proposing treatment technology that will achieve the required effluent limitations. Due to site-specific factors including those listed above, there may be circumstances where a new or expanded discharge to surface water may be financially or technologically impractical. The applicant may need to consider scaling back the project or instituting alternative wastewater disposal options such as individual septic systems, an on-site community groundwater disposal system, or connection to a regional wastewater treatment plant. Where a discharge is feasible in Category One waters, the cost of operation may be significantly more than existing operations or discharges to Category Two waters.

In Category Two waters, the location and type of proposed activity are important factors in determining the range of economic impacts. Consistent with the Federal antidegradation policies, a lowering of water quality may be allowed to accommodate important social and economic development. The Department has added a new definition of "necessary and justifiable social or economic development" at N.J.A.C. 7:9B-1.4 that describes the activities that qualify for a lowering in water quality. The Department used the State Development Redevelopment Plan (SDRP) as a guide for where development should be encouraged and, if necessary, a lowering in water quality should be allowed. This includes development located in areas designated pursuant to SDRP (N.J.S.A. 52:18A-196 *et seq.*) as Planning Area 1 (Metropolitan) and Planning Area 2 (Suburban), or Designated Center. In Planning Area 3 (Fringe), Planning Area 4 (Rural), and Planning Area 5 (Environmentally Sensitive), development is restricted to protect important environmental resources. Additionally, the Department determined that projects needed for public health and safety, and new and expanded

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public institutions should also be considered as “necessary and justifiable social or economic development.”

An applicant proposing a new or expanded discharge to a Category Two water may incur additional costs to demonstrate that it is impossible to prevent a calculable change in water quality without incurring substantial economic impact. The applicant may need to contract professional services to perform this economic analysis.

As indicated in N.J.A.C. 7:9B-1.5(d)4iv, the applicant with a project that qualifies as a “necessary and justifiable social or economic development” and those who can demonstrate cost will result in “substantial economic impact,” may need to evaluate the range of treatment options available to minimize the lowering water quality as part of an antidegradation analysis. The Department will consider the cost of the range of options, the anticipated water quality, and the cost to the users to establish effluent limits that minimize any lowering in water quality that may be allowed.

An applicant seeking to construct a new or expanded wastewater treatment system for a project that does not qualify as “necessary and justifiable social or economic development” or is proposed to discharge in the Highlands Preservation Area will incur impacts similar to applicants proposing a new or expanded discharge to a Category One waterbody.

The proposed amendments to the antidegradation policies to maintain the existing water quality where threatened and endangered species are present are not expected to result in additional economic impact for point source discharges. The USEPA concurs that, until the formal review of the 304(a) criteria is completed as required by a Memorandum of Agreement (MOA) (66 Fed. Reg. 11202, February 22, 2001) between USEPA and the United States Fish and Wildlife Service, the aquatic criteria pursuant to existing 304(a) are considered to be adequately protective of threatened and endangered species. The Department will continue to utilize the aquatic life criteria at N.J.A.C. 7:9B-1.14 to develop water quality based effluent limits until the review pursuant to the MOA is completed. However, the promulgation of

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Category One antidegradation designation for several waterbodies based on exceptional ecological significance should provide additional protection for threatened and endangered species. Therefore, any economic impact associated with proposed N.J.A.C. 7:9B-1.5(d)1i will be triggered if the applicant proposes a new or expanded discharge to a waterbody that has been upgraded to Category One to protect threatened and endangered species.

Mercury and PCBs Monitoring:

The proposed amendments at N.J.A.C. 7:9B-1.5(e)7 that requires NJPDES permittees to monitoring for mercury and PCBs using more sensitive analytical methods for the purpose of characterizing the effluent is expected to cause an economic impact, however, the impact is not expected to be substantial. The NJPDES permitting program currently requires permittees to monitor the concentration of mercury and PCBs in their effluent. This new provision may require NJPDES permittees to contract with an outside laboratory or upgrade inhouse laboratory facilities to conduct analysis using the required method. Additional costs would be incurred by all NJPDES permittees depending on sampling requirements imposed in the NJPDES permit.

Bacterial Quality Criteria

The Department is proposing to readopt the existing bacterial criteria for shellfish water. Similarly, the Department is not proposing any changes to enterococci criteria in SE1 and SC waters. As indicated in the Summary, the Department is not imposing these criteria as effluent limitations. Therefore, these criteria should not generate any economic impact to existing NJPDES dischargers.

The fecal coliform criteria applicable to FW2, SE1, and SC waters are being proposed for deletion. This repeal of fecal coliform criteria may not provide any economic benefit because the NJPDES dischargers should still provide disinfection in accordance with the NJPDES effluent standards (N.J.A.C. 7:14A-12.5(b)). No change is being proposed to the fecal coliform criteria applicable to SE2 and SE3 waters. Monitoring for fecal coliform is required by the NJPDES program. The cost associated with this sampling requirement will depend on the

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monitoring requirements imposed in the facility's NJPDES permit based on the size of the facility.

The newly proposed E. coli criteria for FW2 waters may or may not generate economic impact to the NJPDES dischargers. Because E. coli is a component of fecal coliform, if the existing dischargers are in compliance with the existing fecal coliform criteria for FW2 waters, they should be able to meet the E. coli criteria. If a facility currently exceeds the geometric mean of 200 fecal coliform levels per 100 ml, that facility will need enhanced treatment controls to meet the permit limits. As indicated in the summary, the NJPDES program will continue to require monitoring for fecal coliform. The cost associated with this sampling requirement will depend on the monitoring requirements imposed in the facility's NJPDES permit based on the size of the facility.

The Department of Health and Senior Services already requires the operators of bathing beaches to monitor beaches and close where appropriate using enterococcus pursuant to New Jersey State Sanitary Code at N.J.A.C. 8-26. The new Enterococcus criteria in the SWQS should not result in additional economic costs. Using enterococcus to evaluate the overall sanitary quality should ensure higher levels of protection for recreational beach users.

Temperature Criteria

The proposed amendments to temperature criteria for trout production waters are not expected to generate additional economic impact to existing dischargers to trout production waters. Currently, the temperature criteria for trout production waters allow no deviation beyond 0.6°C in the ambient temperature. The Department is proposing a maximum temperature limit of 20°C for trout production waters, similar to the existing criterion for trout maintenance waters. According to the recodified policy at proposed N.J.A.C. 7:9B-1.5(h)2i, discharges to trout production waters that do not increase stream temperature by more than 0.6°C, as measured outside the heat dissipation areas, comply with the temperature criteria. However, as described in the summary, many streams are impaired for temperature. NJPDES regulated discharges,

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even those that meet the temperature criteria, discharging to a waterbody impaired for temperature may incur additional costs to monitor the ambient stream temperature upstream and downstream of the discharge. If a TMDL is established and the discharge is determined to be the source of the temperature exceedance, the facility need to evaluate options to reduce effluent temperature. This could include relocation of the outfall, innovative treatment technology or elimination of the discharge. The magnitude of costs will depend on site-specific factors such as stream classification, stream flow, effluent flow and the temperature of the effluent.

Toxic Pollutants Criteria:

The proposed water quality criteria will continue the economic impact associated with complying with the rules. Costs of compliance for water quality sampling, analysis, and reporting will not change because these activities are already required by the Department to satisfy existing Federal regulations whenever NJPDES permits are initially issued, renewed, or modified. Prevention of further degradation of the surface waters is one step toward maintaining the quality of the surface water. This will have a positive economic benefit for the public health (including reduction in medical expenses) and ecological values, as well as for recreational, industrial, and agricultural users of the State's waters.

The potential economic impact of the proposed surface water quality criteria is highly variable. Costs would be mainly incurred by either: 1) new dischargers required to comply with effluent limitations based upon the existing or proposed criteria where reasonable potential has been demonstrated regarding the need for WQBELs; or 2) existing NJPDES permittees required to comply with effluent limitations based upon the existing or proposed criteria because the discharge is into a water quality-limited surface water. Where continued actions are required to comply with effluent limitations based upon the proposed criteria, the costs will vary widely. The magnitude of the economic impacts will be determined by the approach a discharger or potential discharger implements to comply or continue to comply with the effluent limitations. Possible approaches to meet effluent limitations include:

- modification of existing treatment;

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- construction and operation of additional treatment units;
 - pretreatment at the source(s) of the pollutant(s);
 - potential for pollutant trading through watershed-based approaches to NJPDES permitting;
 - pollution prevention (for example, substitution of less toxic or nontoxic chemicals for the pollutants at the point of generation); and
 - source reduction (for example, reclamation or recycling of pollutants).

In addition, the magnitude of the economic impacts will be determined by the factors required to develop WQBELs. WQBELs are derived using several factors, including the volume of waste water discharge, pollutant-specific upstream concentration, the applicable design flow of the receiving waterbody specified at N.J.A.C. 7:9B-1.5(c)2, the appropriate water quality criterion (acute, chronic, or human health criterion) and the applicable averaging periods. Due to the number of factors utilized in the derivation process of the WQBELs, which may result in dramatically different values based on the site specific conditions, it is difficult to estimate the economic impact associated in each case.

However, the Department analyzed the discharge monitoring report (DMR) data from municipal and industrial facilities available from a two-year period (January 2002 to December 2003) in order to evaluate and estimate the economic impact that may result from the proposed criteria. The average values available from the DMR data is a collection of data gathered from discharges to both fresh and saline waters.

The Department evaluated DMR data to identify those pollutants where more than ten percent of the reported values were quantified. The Department further analyzed this list of pollutants to identify whether the average value is greater than the most stringent proposed criterion (which includes aquatic and human health criteria for both fresh and saline waters). By comparing the average value with the most stringent proposed criterion, the Department was able to identify which pollutant may cause a NJPDES discharger to incur additional costs. The list of pollutants where the average value is greater than the most stringent proposed criterion are

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provided in Table 7. However, as indicated above, the WQBEL is dependent on a variety of site-specific conditions including whether the discharge will impact freshwater or salt water. Therefore, it is difficult to identify the extent of additional economic impacts to each potentially impacted facility as a result of the proposed criteria.

Table 7. Comparison of Average Values from DMR Data with Proposed Criteria

Parameter Description	Parameter Code	No. of Values	No. of Facilities Reporting at least one value	No. of Non-Detects	No. of detected values	Average Value	Proposed SWQ Criterion
Antimony, Total Recoverable	01268	130	64	108	22	15.67958	5.6(HF)
Arsenic, Total Recoverable (as As)	00978	448	171	353	95	8.99127	0.017(HF)
Bis(2-ethylhexyl)phthalate	39100	585	200	324	261	5.88346	1.2(HF)
Bromodichloromethane	38693	192	122	132	60	2.65772	0.55(HF)
Bromoform	32104	228	156	206	22	5.12968	4.3(HF)
Cadmium, Total Recoverable	01113	431	170	381	50	3.73582	3.4(HF)
Chlorodibromomethane	34306	215	152	169	46	1.16497	0.4(HF)
Copper, Dissolved (as Cu)	01040	16	1	4	12	17	3.1(SC)
Copper, Total Recoverable	01119	961	218	217	744	31.68807	3.7(SC)
Cyanide, Total (as CN)	00720	396	181	329	67	22.7015	1(SC)
Dibromochloromethane	32105	19	4	0	19	16.11474	0.4(HF)
1,2-Dichloroethane	32103	348	176	294	54	5.1536	0.29(HF)
1,2-Dichloropropane	34541	140	85	121	19	2.44391	0.50(HF)
Lead, Total Recoverable	01114	659	195	524	135	9.95693	7.5(FC)
Mercury Total Recoverable	71901	452	147	402	50	5.80782	0.05(HF)
Methylene Chloride	34423	314	165	240	74	20.61294	2.5(HF)
Nickel, Total Recoverable	01074	486	180	338	148	23.91397	22(SC)
Selenium, Total Recoverable	00981	247	146	214	33	7.80761	5(FC)
Silver, Total Recoverable	01079	442	169	386	56	7.36281	2.2(SA)
2,3,7,8-Tetrachlorodibenzo-p-dioxin	34675	114	61	111	3	90**	0.000000005(HF)
Tetrachloroethylene	34475	469	194	386	83	24.09074	0.34(HF)
Trichloroethylene	39180	457	175	372	85	2.97342	1(HF)

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Zinc, Total Recoverable	01094	993	221	105	888	103.38658	85(SC)
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- HF Freshwater human health criterion
- FC Freshwater chronic aquatic criterion
- SC Saline chronic aquatic criterion

** Reported MDL ranged from <.0000022 to <10,000. Many facilities reported 0.00

Stream Classifications:

The potential economic impacts of the proposed reclassification to higher status trout waters and corresponding redesignation of antidegradation categories vary from no impact to some impact. More stringent discharge permit limitations necessitating construction and operation of additional treatment units for new dischargers would be required which would cause a potential economic impact. In addition, prohibition of new discharges and relocation of proposed discharges that may affect water quality also would cause a potential economic impact. The potentially affected dischargers within the sub-watershed (HUC 14) of each of the waterbodies proposed for upgrade are listed in Table 8 below.

The antidegradation provisions of the Surface Water Quality Standards are triggered when an applicant proposes an activity that has the potential to lower water quality. Previously approved wastewater discharges authorized through the NJPDES program as well as existing development are not subject to the antidegradation policies described below unless a new or expanded activity is proposed.

For existing NJPDES dischargers that are not proposing an expansion, the proposed Category One antidegradation designation amendments will not automatically require an upgrade of treatment capabilities. However, reclassifying waters from FW2-NT or FW2-TM to FW2-TP(C1), may require an upgrade of wastewater treatment for existing dischargers, upon renewal of their permit because FW2-TP(C1) requires stricter water quality criteria.

Table 8. Potentially affected NJPDES dischargers

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(Potentially affected due to reclassification to trout production and/or Category One antidegradation designation within the HUC 14 boundaries)

Waterbody	Facility
Passaic, Hackensack, and New York Harbor complex Basin	
Beech Brook (West Milford Twp.)	No dischargers in or above proposed segment
Stone House Brook (Butler)	NJ0025721 Butler WTP (3 outfalls)
Saddle River (Upper Saddle River)	No dischargers in or above proposed segment
Wanaque River (Pompton Lakes)	NJ0053759 Wanaque Valley RSA NJ0062111 North Jersey District Water Commission

WTP - Water Treatment Plant

RSA Regional Sewerage Authority

Any NJPDES permit issued to a facility for a new or expanded wastewater discharge to a Category One stream segment must include effluent limitations that will ensure that existing water quality will be maintained. In calculating effluent limitations, the Department considers the size of the receiving stream, the volume of wastewater, current levels of pollutants in the receiving stream, and effluent characteristics. These site-specific conditions preclude a “one size fits all” analysis. A new or increased discharge may not be possible in all situations. An applicant would be required to determine existing water quality as part of their NJPDES application and demonstrate that the new or expanded discharge would not result in a measurable change in water quality.

Renewal of an existing discharge permit does not require an antidegradation analysis unless additional flow or loading is requested as part of the renewal of an existing discharge permit. As part of permit renewal (with or without increases in flow or loading) and the issuance of new permits, the Department evaluates the available information for compliance with regulatory requirements. Such regulatory requirements are water quality based effluent limitations, adopted Total Maximum Daily Loads, Effluent Limitation Guidelines, and Clean Water Enforcement Act provisions. This review could result in new effluent limitations due to the change from non-trout or trout maintenance to trout production reclassification.

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Environmental Impact

The proposed re-adoption with amendments of the Surface Water Quality Standards will have a positive environmental impact by continuing to restore, maintain, and enhance the chemical, physical and biological integrity of New Jersey's waters. The proposed amendments are intended to efficiently and predictably provide appropriate levels of protection for human health, aquatic biota and ecological systems associated with the State's waters. These amendments also represent the Department's continuing efforts to restore, maintain, and enhance the chemical, physical and biological integrity of New Jersey's waters; protect scenic and ecological values; enhance the domestic, municipal, recreational, and other reasonable uses of the State's waters; and provide general environmental benefits.

Some proposed amendments, like the administrative corrections, are environmentally neutral, while others, like antidegradation implementation policies, upgraded water quality criteria, and stream classifications will produce positive environmental impacts.

The Department is proposing significant revisions to antidegradation policies at N.J.A.C. 7:9B-1.5(d). The proposed amendments to the antidegradation policies are intended to provide consistent and predictable implementation, maintain water quality and protect existing and designated uses, including threatened and endangered species.

The proposed antidegradation provisions require new or expanded discharges to maintain existing water quality in Category One waters. In Category Two waters, lowering of water quality may be allowed if the projects qualify as necessary and justifiable social or economic development or the cost to prevent a lowering in water quality would result in substantial economic impact. Additionally, an existing discharge will be required to demonstrate that it cannot comply with pollutant loadings based on its current permit or effluent quality, before additional loading will be considered. The Department requires applicants to examine pollution prevention and waste minimization measures as part of the antidegradation review process pursuant to proposed N.J.A.C. 7:9B-1.5(d)4. If additional loading is warranted, the applicant

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must consider a range of treatment options and implementation costs that address the additional loading. The Department believes that implementation of these proposed amendments will result in a positive environmental impact. The continued implementation of the antidegradation provisions resulting from this re-adoption with amendments will have a positive environmental impact by requiring analysis of water quality impacts from new or expanded discharges and imposing measures that reflect the consideration of maintaining water quality, pollution prevention, and minimization of potential water quality impacts.

The Department is proposing to amend several aquatic life-based and human health-based criteria at N.J.A.C. 7:9B-1.14(d). The proposed criteria, based on updated information, are more appropriate for water quality protection. The proposed human health criteria update is based on a more stringent fish consumption rate of 17.5 grams per day. Permits based on more stringent criteria are environmentally beneficial, as there will be fewer toxic substances in ambient water.

The upgraded stream classifications and/or antidegradation designations proposed at N.J.A.C. 7:9B-1.15 will provide a beneficial environmental effect. These stream reclassifications provide beneficial environmental impact because they establish more protective criteria for new or expanded discharges to these water bodies to assure that water quality is maintained at a level necessary to support trout and related species. In addition, the proposed upgrade to trout production increases the number of river miles with Category One antidegradation designation by nine miles. The additional protection provided by the Category One antidegradation designation prevents degradation of existing water quality. Implementation of these rules through permitting and planning programs will maintain the chemical, physical, and biological integrity of the proposed Category One waters.

Federal Standards Analysis

Executive Order 27 (1994) and N.J.S.A. 52:14B-1 *et seq.* require that State agencies which adopt, readopt, or amend State regulations that exceed any Federal standards or requirements include in the rulemaking document a Federal standards analysis.

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The Federal Clean Water Act (CWA), 33 U.S.C. 1251 *et seq.*, as amended by the Water Quality Act of 1987 (PL 100-4) requires the establishment of water quality standards for all surface waters of the United States. (The Water Quality Act of 1987 amended the CWA to require the adoption of criteria for toxic pollutants identified as causing or contributing to an impairment of a waterbody's designated use(s).) Individual states are given primary responsibility for developing and adopting surface water quality standards applicable to their waters. The USEPA is responsible for overseeing and approving state water quality standards, providing guidance on the content of the standards, and developing water quality criteria guidance documents. Key elements of the surface water quality standards program required under the CWA are: a classification system establishing designated beneficial uses of the waters; ambient water quality criteria necessary to protect those uses; minimum uses to be attained, which reflect the fishable and swimmable goals of the CWA; and antidegradation policies and implementation procedures to prevent water quality from deteriorating. Furthermore, the CWA includes provisions requiring the USEPA to promulgate superseding Federal standards where the USEPA concludes that a State's standards are not consistent with the requirements of the CWA, or where Federal requirements are necessary to meet the requirements of the CWA.

The SWQS being proposed for re-adoption with amendments are required by and consistent with the Federal statutes, regulations and guidance. The Department has prepared the following sectional analysis of the SWQS, which compares each section with the applicable Federal law, regulations and guidance, as required by Executive Order 27 (1994) and P.L. 1995, c. 65.

N.J.A.C. 7:9B-1.1 through 1.3 describes scope, construction, and severability. Nothing in these sections is subject to Federal standards; therefore, no further analysis is needed.

N.J.A.C. 7:9B-1.4 contains definitions of terms used within the SWQS. Most of these definitions are the same as those used by the Federal government in either the Federal Water Quality Standards Regulation at 40 CFR 131.3 or in the glossary of a guidance document for

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states entitled *Water Quality Standards Handbook: Second Edition* (August 1994, EPA-823-B-94-005a) (Handbook). There are a few definitions that can not be found in the Federal regulations or guidance documents however, each one of them are consistent with the Federal policies. For example, the proposed definition of "substantial economic impact" is not defined in the Federal regulations however, the concept is from the USEPA's guidance (*Interim Economic Guidance for Water Quality Standards Workbook* EPA-823-B-95-002 March 1995).

N.J.A.C. 7:9B-1.5 establishes the policies applicable to the protection and enhancement of surface water resources throughout the State. These include general, interstate waters, general technical (including mixing zone policies), antidegradation, water quality-based effluent limitation, bioassay and biomonitoring, and nutrient policies. The general policies and interstate waters policies at N.J.A.C. 7:9B-1.5(a) and (b) are either exempt from Federal standards, or identical to language found in the Federal Water Quality Standards Regulations (see 40 CFR 131).

The general technical policies are specified at N.J.A.C. 7:9B-1.5(c). These policies include the design flows for different types of water quality criteria and metal translators for developing effluent limitations or expressing aquatic life criteria in the equivalent total recoverable form. The USEPA provides guidance and recommendations on design flows in the Handbook and in the Technical Support Document. The design flows and the metal translators specified at N.J.A.C. 7:9B-1.5(c) are identical to the USEPA recommendations, therefore, no further analysis is required.

Antidegradation policies are specified in the SWQS at N.J.A.C. 7:9B-1.5(d). The Federal regulation governing antidegradation policies is found at 40 CFR 131.12. It requires that states develop and adopt antidegradation policies and implementation procedures to ensure that the level of water quality needed to protect existing uses is maintained. Additionally, it states that water quality better than necessary to protect existing uses shall be maintained and protected unless demonstrations are made to support lowering the water quality. New Jersey's antidegradation policies are consistent with and do not impose restrictions more stringent than

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those allowed under the Federal water quality standards regulations. Therefore no further analysis is required.

N.J.A.C. 7:9B-1.5(e-g) and 1.6 set forth policies, conditions and procedures to be used when developing water quality-based effluent limitations, bioassays, and nutrient policies, including general applicability, necessary information, and methodologies. They are based on Federal NPDES regulations at 40 CFR 122.44(d), and Federal guidance derived from *Technical Support Document for Water Quality-based Toxics Control* or the TSD (EPA/505/2-90-001). Therefore, no further analysis is required.

New Jersey's mixing zone policies are found at N.J.A.C. 7:9B-1.5(h). Mixing zones are defined in the SWQS as localized areas of surface waters, as may be designated by the Department, into which wastewater effluents may be discharged for the purpose of mixing, dispersing, or dissipating such effluents without creating nuisances or hazardous conditions. If applied to a particular discharge, they result in less stringent NJPDES permit limitations. Federal regulations governing mixing zones clearly state that inclusion of mixing zones in State SWQS is optional. 40 CFR 131.13 provides that "States may, at their discretion, include in their State surface water quality standards, policies generally affecting their application and implementation, such as mixing zones..." None of the language in the SWQS regarding mixing zones is more stringent than provided for in the Federal rule; therefore no further analysis is necessary. The Department notes that the USEPA's Handbook and TSD provide guidance for developing and implementing mixing zone regulations for states that include mixing zones in their SWQS. N.J.A.C. 7:9B-1.5(c)4 does not contain any provisions that are more stringent than those contained in the Handbook or TSD.

N.J.A.C. 7:9B-1.7 requires that any total maximum daily load, wasteload allocation, or load allocation established as an amendment to an areawide water quality management plan must be consistent with this chapter. This language mirrors the Federal water planning regulation language found at 40 CFR 130.7(c); therefore, no further analysis is required.

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N.J.A.C. 7:9B-1.8 and 1.9 set forth the procedures to be followed by applicants requesting a modification (also called variances) of WQBELs for discharges into Category One and Category Two waterbodies, respectively. There is no specific Federal regulation requiring that states adopt such variance procedures into their water quality standards. At 40 CFR 131.13 it is stated, "States may, at their discretion, include in their State surface water quality standards, policies generally affecting their application and implementation, such as... variances." The USEPA provides further guidance in the Handbook for developing and implementing regulations governing variances for States that do include them in their SWQS. The Federal variance guidance found on pages 5-11 and 5-12 in the Handbook does not address whether or not states should allow variances for dischargers into Outstanding National Resource Waters (ONRWs). However, the Federal water quality standards regulations, which set forth antidegradation policy requirements at 40 CFR 131.12(a)(3), specifically state that water quality in waters designated as ONRWs shall be maintained and protected. N.J.A.C. 7:9B-1.8 and 1.9 largely mirror language contained within the Handbook guidance in Chapter 5 (pages 5-11 and 5-12). One exception is that New Jersey's variance procedures at N.J.A.C. 7:9B-1.8(c) do not allow for modifications of WQBELs for dischargers into ONRWs. N.J.A.C. 7:9B-1.8(c) reflects the intent of the Federal rule at 40 CFR 131.12(a)(3) that ONRW quality must be maintained and is not more stringent. No further analysis is therefore required.

N.J.A.C. 7:9B-1.10 sets forth specific requirements for petitioning the Department to remove a designated use from a waterbody. This language incorporates Federal requirements found at 40 CFR 131.10 (g) and (h) and is not more stringent. No further analysis is required.

N.J.A.C. 7:9B-1.11 sets forth specific requirements for petitioning the Department to add a designated use to a waterbody. This language incorporates Federal requirements found at 40 CFR 131.10 (i) and is not more stringent. No further analysis is required.

N.J.A.C. 7:9B-1.12 and 1.13 provide for the designated uses of the different surface water classifications of New Jersey and of the Delaware River and Bay. The Federal water quality standards regulations at 40 CFR 131.10(a) require that states specify appropriate uses to

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be achieved and protected in their surface waters. The Handbook gives further guidance on designating uses for surface waters: “consistent with the requirements of the CWA and Water Quality Standards Regulation, states are free to develop and adopt any use classification system they deem appropriate, except that waste transport and assimilation is not an acceptable use in any case (see 40 CFR 131.10(a)).” The uses specified in N.J.A.C. 7:9B-1.12 and 1.13 are therefore, consistent with Federal requirements and no further analysis is required.

N.J.A.C. 7:9B-1.14 contains the surface water aquatic life and human health protection criteria (both narrative statements and numerical values) for waters classified as PL, FW2, SE and SC. New Jersey has adopted criteria for pollutants to protect the aquatic biota and humans from detrimental effects from exposure to these pollutants in surface waters of the State. N.J.A.C. 7:9B-1.14 also states that the surface water criteria for the Delaware River and Bay are as contained in the Delaware River Basin Commission regulations. Federal regulations require that states must adopt water quality criteria that protect the designated uses (40 CFR 131.11 (a)(1)). The numerical criteria should be based on CWA Section 304(a) guidance or 304(a) guidance modified to reflect site-specific conditions, or other scientifically defensible methods (40 CFR 131.11(b)(1) (i.-iii.)).

To determine whether any New Jersey criteria being proposed herein for re-adoption or amendment are more stringent than Federal criteria, the Department compared each with CWA Section 304(a) criteria promulgated by the USEPA through NTR for New Jersey. These criteria are enforceable Federal surface water quality criteria in New Jersey. However, for parameters for which the USEPA has not promulgated criteria through the NTR, the Department compared New Jersey’s criteria with the respective USEPA recommended criteria published as part of *National Recommended Water Quality Criteria 2002*. EPA 822-R-02-047. The Federal statute and rules do not require states to adopt guidance criteria as part of SWQS.

New Jersey criteria for toxic substances may be considered more stringent than NTR criteria or 304(a) criteria if they are numerically lower. Differences in numerical values between criteria can be attributed to a number of factors which could result in New Jersey criteria being

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either more stringent or less stringent than the NTR criteria or 304(a) guidance criteria. In the following analysis, the Department explains the differences in State and Federal numerical values where the New Jersey criteria are more stringent or the relative stringency cannot be ascertained. Because of the complex nature of calculating criteria, the derivation of the criteria is also briefly described for clarification, wherever warranted.

General Criteria:

The Department has identified that New Jersey's pH criterion, 6.5-8.5 standard units for FW2 waters, is more stringent than the CWA Section 304(a) guidance criterion of 6.5-9.0 standard units. However, the Federal water quality regulations (40 CFR 131.11(a)(1)) note that: "States must adopt those water quality criteria that protect the designated use." A pH criterion of 6.5-8.5 reflects the pH range naturally occurring in New Jersey's surface waters classified as FW2 and was adopted to protect the designated uses specified in the SWQS. These criteria are approved by the USEPA, and therefore, no further analysis is required.

Aquatic Life Protection Criteria:

Proposed Metals criteria: The proposed aquatic life-based freshwater acute and chronic criteria for arsenic, cadmium, chromium III, copper, and nickel and freshwater acute criteria for mercury and silver appear to be more stringent when compared with the NTR criteria. Where the criteria are hardness-dependent, a criterion derived at a hardness of 100 mg/L of CaCO₃ is used for comparison purposes. The proposed criteria are based on the 304(a) national recommendations. However, the freshwater acute and chronic criteria for cadmium, chromium III, chromium VI, copper, nickel, and zinc also appear to be more stringent than the 304(a) national recommendations. The apparently more stringent criteria are necessary because the proposed criteria presented in Table 9 reflect the dissolved criteria using the DRBC conversion factors that are lower than the USEPA conversion factors (See Table 10). The DRBC conversion factors have been approved by the USEPA as acceptable conversion factors for converting total recoverable criteria into dissolved criteria (see Summary above). Therefore, the criteria and the conversion factors used are appropriate to maintain the uses.

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The proposed aquatic life-based saltwater acute and chronic criteria for cadmium and acute criterion for nickel appear to be more stringent than the NTR criteria. The proposed saltwater criteria for cadmium are based on the 304(a) national recommendation. The proposed saltwater criteria for nickel are based on the recommended criteria by GLEC. The proposed saltwater acute criterion is more stringent and the chronic criterion is less stringent than the 304(a) national recommended criteria. However, the revised proposed criteria are based on more recent toxicity data available. The USEPA recommends updating criterion as new toxicity data become available. In addition, these revised criteria were derived based on the USEPA recommended methodology and have been reviewed and approved by the USEPA for consistency. Therefore, the proposed criteria are meeting the Federal requirements at 40 CFR 131.11(a)1.

Proposed criteria for other toxic pollutants: The proposed aquatic life-based freshwater acute and chronic criteria for gamma BHC, dieldrin, endrin, and pentachlorophenol based on updated toxicity information in the NRWQC 2005. These revised criteria were derived based on the USEPA recommended methodology, therefore, meeting the Federal requirements.

Criteria proposed for re-adoption: As explained further below, New Jersey aquatic life protection criteria for endosulfans (alpha and beta) proposed for re-adoption without change are more stringent than the NTR criteria because the Department and the USEPA regulate different forms of the chemicals. The freshwater acute and chronic criteria for lead are not comparable with the NTR criteria because of conflicting analyses regarding the relationship between lead toxicity and water hardness.

The freshwater acute and chronic criteria of 0.22 μ g/L and 0.056 μ g/L, respectively, and saline acute and chronic criteria of 0.034 μ g/L and 0.0087 μ g/L, respectively for endosulfans (alpha and beta) are numerically equivalent to the USEPA criteria, but in application are more stringent than the 304(a) criteria. The difference exists because the Department regulates the family of endosulfans, which includes both alpha and beta forms, while the USEPA criteria are chemical-specific, either for alpha-endosulfan or beta-endosulfan, even though the same data

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were utilized by the USEPA and the Department to calculate the endosulfan criteria. For example, the New Jersey freshwater acute endosulfans criterion allows 0.22 μ g/L of total endosulfans, both alpha and beta forms together. The USEPA freshwater acute criterion for endosulfans, however, allows for 0.22 μ g/L of alpha-endosulfan and 0.22 μ g/L of beta-endosulfan. The Department has determined that the New Jersey aquatic life protection criteria for endosulfan as total endosulfans is more appropriate than the USEPA endosulfan criteria, because the toxicity data from which the criteria were derived were obtained from a mixture of alpha and beta forms. The USEPA has approved these criteria to be protective of the uses.

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Table 9. COMPARISON OF AQUATIC METALS CRITERIA
(NTR / 304(a) / NJ Proposed)
(µg/L)

Toxic substance	Freshwater						Saltwater					
	Acute			Chronic			Acute			Chronic		
	NTR	304(a)	NJ-Prop	NTR	304(a)	NJ-Prop	NTR	304(a)	NJ-Prop	NTR	304(a)	NJ-Prop
Arsenic	360	340	340	190	150	150	69	69	69	36	36	36
Cadmium	3.7a	4.3a	1.4a	1.0a	2.2a	0.17a	42	40	40	9.3	8.8	8.8
Chromium(III)	550a	570a	500a	180a	74a	24a						
Chromium(VI)	15	16	15	10	11	10	1100	1100	1100	50	50	50
Copper	17a	13a	13a	11a	9a	8.5a	2.4	4.8	4.8	2.4	3.1	3.1
Mercury	2.1	1.4	1.4	0.012	0.77	0.77	1.8	1.8	1.8	0.025	0.94	0.94
Nickel	1400a	470a	400a	160a	52a	44a	74	74	64	8.2	8.2	22
Selenium	20	b	20	5	5	5	290	290	290	71	71	71
Silver	3.4a	3.2a	3.2a				1.9	1.9	1.9			
Zinc	110a	120a	110a	100a	120a	110a	90	90	90	81	81	81

a Dissolved criteria derived at a hardness of 100 mg/L

b Criteria under review

Table 10. Comparison of Conversion Factors

Chemical	Freshwater			
	Acute		Chronic	
	USEPA	DRBC	USEPA	DRBC
Cadmium	0.944a	0.651+	0.944a	0.651+
Chromium III	0.361	0.277+	0.860	0.277+
Chromium VI	0.982	0.919+	0.962	0.919+
Copper	0.960	0.908+	0.960	0.908+
Nickel	0.998	0.846+	0.997	0.846+
Zinc	0.978	0.950+	0.986	0.950+

a Hardness dependent conversion factor derived at 100 mg/L CaCO₃

+ DRBC recalculated conversion factors

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The freshwater acute and chronic criteria for lead are not comparable with the NTR criteria because the NTR promulgated freshwater criteria for lead are hardness-dependent equations, and the criteria promulgated by the Department are non-hardness-dependent values. Although the NTR and the Department have promulgated an identical saltwater acute criterion, the Department's chronic criterion is less stringent. These criteria, based on the USEPA recommended methodology, have been approved by the USEPA, thus satisfying the Federal requirements at 40 CFR 131.11(a)1.

Human Health Criteria:

To determine whether any proposed New Jersey human health criteria are more stringent than the corresponding Federal criteria, the Department compared them with CWA section 304(a) human health criteria published by the USEPA. The criteria being proposed to replace the NTR criteria are compared with section 304(a) criteria promulgated by the USEPA through the NTR for New Jersey. Other New Jersey criteria are compared with the respective section 304(a) guidance criteria recommended by the USEPA in the *National Recommended Water Quality Criteria: 2002 (EPA822-R-02-47)* or "*National Recommended Water Quality Criteria for the Protection of Human Health*" (68 Fed. Reg. 75507, December 31, 2003). It should be noted that the proposed New Jersey human health criteria are termed FW2 and saline criteria, derived for fresh and saline surface waters of specific classifications, while the Federally promulgated or recommended criteria are identified as "for consumption of water & organisms" or "for consumption of organisms only." The New Jersey criteria are derived in analogous manner to the corresponding Federally derived criteria and intended to protect the same designated uses. Therefore, the two sets of criteria are directly comparable.

NTR Criteria: Criteria being proposed to replace the NTR criteria are based on the 2002 or 2003 USEPA recommended criteria except that criteria for 1,1-dichloroethylene, 1,1,2,2-tetrachloroethane and 1,1,2-trichloroethane are based on toxicity factors recommended by the NJDWQI. Because of scientific advances in criteria development from 1992, when the NTR was promulgated, to 2002/2003, when the recommended criteria were recently updated, some criteria

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have been revised by the USEPA to become less stringent or more stringent to reflect current science. Compared with the NTR criteria, seven of the 11 New Jersey criteria proposed to replace the NTR are more stringent because they are numerically lower, as shown in the following table and for the reasons discussed below.

Table 11. NTR Criteria Compared With NJ Proposed Criteria and USEPA National Recommended Criteria (NRWQC)*

Toxic Substance	Freshwater Human Health Criteria (µg/L)			Saline Human Health Criteria (µg/L)		
	NTR	New Jersey	NRWQC	NTR	New Jersey	NRWQC
gamma-BHC	0.19	0.98	0.98	0.63	1.8	1.8
Dibromochloromethane				340	13	13
1,1-Dichloroethylene				32	100	7,100
Fluorene				14,000	5,300	5,300
Hexachlorobutadiene				500	18	18
Isophorone				6,000	960	960
PCBs	0.00017	0.000064	0.000064	0.00017	0.000064	0.000064
1,1,2,2-Tetrachloroethane				110	110	4.0
1,1,2-Trichloroethane				420	350	16

*Data from Summary Table 4 on "Chemical-Specific Surface Water Human Health Criteria"

Of the seven proposed criteria that are more stringent, six are based on the USEPA *National Recommended Water Quality Criteria: 2002*. They were derived with the 2000 Human Health Criteria Development Methodology, including updated fish consumption rate of 17.5 g/day and toxicity factors. These six include the proposed saline criteria for dibromochloromethane (13 µg/L), fluorene (5,300 µg/L), hexachlorobutadiene (18 µg/L), isophorone (960 µg/L) and the two proposed criteria for PCBs (0.000064 µg/L for both FW2 and saline). They are more stringent than the NTR criteria at 340 µg/L, 14,000 µg/L, 500 µg/L, 6,000 µg/L, and, for PCBs, at 0.00017 µg/L respectively. For the NJDWQI pollutant 1,1,2-trichloroethane, the proposed saline criterion (350 µg/L) is more stringent than the corresponding NTR criterion (420 µg/L). The criterion for 1,1,2-trichloroethane becomes more stringent as the result of using the updated default fish consumption rate of 17.5 g/day to replace the 1980 rate at 6.5 g/day, as with all criteria derived using the 2000 Methodology. The Department believes that

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the more stringent criteria being proposed are justified, since they are based on USEPA's updated guidance to reflect more recent best available scientific information.

Non-NTR Criteria: Most of the proposed non-NTR criteria are based on the national recommended water quality criteria published by the USEPA in 2002 and 2003. Therefore, these proposed criteria are identical to the corresponding Federal section 304(a) guidance criteria. As discussed above in the Human Health Criteria Section of the Summary, some of the others are based on updated data from the USEPA Integrated Risk Information System (IRIS), the National Primary Drinking Water Regulations (NPDWR), the relative potency approach for Group B2 polycyclic aromatic hydrocarbons. Seven pollutants from the groups mentioned above, namely acrolein, arsenic, endrin aldehyde, nickel, N-nitrosodiethylamine, phenol and methoxychlor, have criteria more stringent than the corresponding NRWQC. The detailed comparisons are shown in Table 12 and discussed as follows:

Thirteen criteria are more stringent (Table 12) than the corresponding NRWQC because updated information was used in developing the proposed criteria. As indicated in Table 12, the proposed fresh water and saline criteria for four pollutants, those of acrolein (6.1 µg/L, 9.3 µg/L), arsenic (0.017 µg/L, 0.061 µg/L), N-nitrosodiethylamine (0.00023 µg/L, 0.13 µg/L) and phenol (10,000 µg/L, 860,000 µg/L), are more stringent than the corresponding NRWQC of acrolein (190 µg/L, 290 µg/L), arsenic (0.018 µg/L, 0.14 µg/L), N-nitrosodiethylamine (0.0008 µg/L, 1.24 µg/L) and phenol (21,000 µg/L, 1,700,000 µg/L). In developing these criteria the Department used recent IRIS data and 2000 methodology to update the 304(a) criteria. The criteria for endrin aldehyde are based on the criteria for endrin because there are no data available for endrin aldehyde. The proposed criteria for endrin aldehyde (0.059 µg/L, 0.060 µg/L) are based on the NRWQC 2003 for endrin, but the NRWQC for endrin aldehyde (0.29 µg/L, 0.30 µg/L) are based on the 2002 endrin data. The proposed nickel criteria (500 µg/L, 1,700 µg/L) are based on the 17.5 g/day fish consumption rate, while the NRWQC criteria (610 µg/L, 4,600 µg/L) are based on the 1980 methodology, using 6.5 g/day as the fish consumption rate. The fresh water criterion for methoxychlor (40 µg/L) from the NPDWR is more stringent than the section 304(a) criterion at 100 µg/L that is based on pre-1980 information. In each of the above comparisons,

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the more stringent proposed criteria are the result of utilizing updated data. The Department is justified to update the criteria to reflect current science.

Some proposed criteria are more stringent because the criteria were derived from toxicity basis or approaches specific to New Jersey, namely, criteria for a few NJDWQI pollutants and Group C carcinogens. The NJDWQI has provided the scientific basis for risk assessment of pollutants. According to 40 CFR 131.11, states have the option to derive water quality criteria different from the USEPA 304(a) criteria if the states' criteria are derived using scientifically defensible methods. The Department used toxicity bases developed pursuant to the New Jersey Safe Drinking Water Act (NJSDWA) in deriving its human health criteria for NJDWQI pollutants for surface waters so as to establish a consistent level of human health protection for all of its water programs. However, different bases could lead to differences in the resulting criteria. Nine of the 20 pollutants based on the NJDWQI have criteria more stringent than the corresponding section 304(a) guidance criteria as shown in Table 12 below. The nine toxic substances are benzene, chlordane, 1,2-dichloroethane, 1,1-dichloroethylene, methylene chloride, tetrachloroethylene, 1,2,4-trichlorobenzene, trichloroethylene and 2,4,6-trichlorophenol. The Department believes its criteria reflect more recent best available scientific information, and therefore, variation from the Federal standard is appropriate.

The proposed freshwater and saline criteria for butylbenzyl phthalate at 150 µg/L and 190 µg/L are more stringent than the corresponding Federal NRWQC at 1,500 µg/L and 1,900 µg/L respectively. Butylbenzyl phthalate is a Group C carcinogen. If an acceptable slope factor is not available to derive a criterion for a Group C carcinogen, the Department's policy mandates the use of an extra uncertainty factor of ten for the RfD to derive the criterion as for a non-carcinogen in order to provide sufficient protection from possible carcinogenic effects. Hence the ten-fold stringency is justified.

Chemical Family/Chemical-Specific Comparison: Some proposed criteria are more stringent than Federal criteria because the Department and the USEPA regulate different forms of the chemicals, as discussed below:

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1). Arsenic: The New Jersey freshwater and saline criteria for arsenic at 0.017 µg/L and 0.061 µg/L are more stringent than the Federal criteria of 0.018 µg/L and 0.14 µg/L, respectively, due also to the differences in chemical forms regulated by New Jersey and USEPA.

The USEPA in promulgating its arsenic criteria included a footnote in the reference stating that the criteria refer only to the inorganic form of arsenic. However, the New Jersey criteria apply to all arsenic forms, organic and inorganic, because of the potential interconversion between organic and inorganic forms of arsenic. Additionally, there is no 40 CFR Part 136 (Guidelines Establishing Test Procedures for the Analysis of Pollutants under the Clean Water Act) approved analytical methodology available to allow for differential measurement of organic and inorganic forms, thus resulting in control efforts applying to all arsenic forms.

2). Endosulfan: New Jersey is proposing fresh water and saline criteria at 62 µg/L and 89 µg/L respectively, for endosulfan (alpha and beta forms combined), that are more stringent than the Federal criteria at 62 µg/L and 89 µg/L respectively, for either alpha-endosulfan or beta-endosulfan. As discussed previously with regard to the Department's aquatic life protection criteria for endosulfans, the Department regulates the family of endosulfans, which includes both alpha and beta forms, while the USEPA has established isomer-specific criteria, for alpha-endosulfan and beta-endosulfan.

The New Jersey endosulfan criteria were derived from IRIS data that were based on a technical grade mixture of alpha- and beta-endosulfan isomers. The USEPA utilized the same information to calculate its criteria, but chose to designate the endosulfan criteria to the specific isomeric forms (alpha or beta). However, the USEPA has previously approved this approach used by New Jersey in the current SWQS. The Department considers the New Jersey human health endosulfans criteria appropriate because the toxicity data from which the criteria were derived were obtained from a mixture of alpha and beta forms and the criteria should be expressed accordingly.

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TABLE 12. New Jersey Proposed Human Health Criteria More Stringent Than USEPA Criteria*

Toxic Substance	Freshwater Human Health Criteria (µg/L)			Saline Human Health Criteria (µg/L)		
	New Jersey	USEPA	Reason	New Jersey	USEPA	Reason
Acrolein	6.1	190	a	9.3	290	a
Arsenic	0.017	0.018	a, d	0.061	0.14	a, d
Benzene [#]	0.15	0.61-2.2	b	3.3	14-51	b
Butylbenzyl phthalate	150	1,500	c	190	1,900	c
Chlordane [#]	0.00010	0.00080	b	0.00011	0.00081	b
1,2-Dichloroethane [#]	0.29	0.38	b	28	37	b
1,1-Dichloroethylene [#]	4.7	330	b	100	7,100	b
Endosulfans (alpha and beta)	62		d	89		d
alpha-Endosulfan		62			89	
beta-Endosulfan		62			89	
Endrin aldehyde	0.059	0.29	a	0.060	0.30	a
Methoxychlor	40	100	a			
Methylene chloride [#]	2.5	4.6	b	310	590	b
Nickel	500	610	a	1,700	4,600	a
N-Nitrosodiethylamine	0.00023	0.0008	a	0.13	1.2	a
Phenol	10,000	21,000	a	860,000	1,700,000	a
Tetrachloroethylene [#]	0.34	0.69	b	1.6	3.3	b
1,2,4-Trichlorobenzene [#]	21	35	b	42	70	b
Trichloroethylene [#]	1.0	2.5	b	12	30	b
2,4,6-Trichlorophenol [#]	0.58	1.4	b	1.0	2.4	b

* Data from SUMMARY Table 4

NJDWQI pollutants

Reason codes for difference in criteria:

- (a) updated information used in developing NJ criteria
- (b) toxicity bases
- (c) Group C policy
- (d) chemical family/chemical-specific

Stream classifications:

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N.J.A.C. 7:9B-1.15 contains specific waterbody classification listings, antidegradation designations, and instructions for the use of the classification tables. The waterbody classifications and antidegradation designations are arranged by major drainage basin. The Federal water quality regulations at 40 CFR 131.10 require that states specify appropriate water uses to be achieved and protected. The Department's SWQS waterbody classification listing is a tool to identify these designated uses such as protection and propagation of fish, shellfish, and wildlife, recreation in and on water, public water supplies, agricultural and industrial. Therefore, these waterbody classifications are consistent with the Federal regulations.

In addition, 40 CFR 131.12 establishes requirements for states to develop and adopt antidegradation policies and implementation procedures to ensure that the level of water quality needed to protect existing uses is maintained, and that water quality better than necessary to protect existing uses is maintained and protected unless demonstrations are made in support of lowering the water quality. The proposed changes in antidegradation designation identify the level of protection and implementation procedures that must be followed. The antidegradation designations are consistent with, and do not exceed Federal standards. Therefore, no further analysis is required.

Jobs Impact

Pursuant to N.J.S.A. 52:14B-1 *et seq.* (P.L. 1995, c. 166), all rule proposals must contain a jobs impact statement assessing the number of jobs to be generated or lost if the proposed rule takes effect.

The implementation of the SWQS through the NJPDES permitting program will continue to result in job opportunities in analytical and environmental consulting services to assess permit compliance and evaluate and design the most cost effective abatement measures to achieve permit compliance. Should such abatement measures involve new capital improvements, job opportunities related to construction and contracting services and operation and maintenance of these improvements would be created. Implementation of the SWQS will result in more of the State's waters achieving designated uses which will enhance job opportunities in industries and

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businesses that are directly and indirectly water related. Failure to implement the SWQS proposed for re-adoption with amendments could result in lost employment opportunities in businesses and industries that are water quality dependent, such as tourism and fishing.

The proposed higher use classification and/or antidegradation categories are not expected to create any additional jobs or cause any jobs to be lost. Losses of existing jobs would only occur in the event that a discharger to one of the waterbodies proposed for reclassification would curtail or cease operations rather than provide the necessary measures to abate NJPDES regulated discharges so as to comply with any new permit requirements based on the SWQS. As discussed in the Economic Impact statement, the imposition of requirements based on the SWQS is waterbody and facility specific.

Agriculture Industry Impact

Pursuant to P.L. 1998, c.48, adopted on July 2, 1998, the Department has evaluated this rulemaking to determine the nature and extent of the impacts of the proposed rules on the agricultural industry. The agricultural industry is not subject to the SWQS unless the operation is required to obtain an NJPDES permit pursuant to N.J.A.C. 7:14A. Farms that operate a food processing operation or conduct other activities which discharge to surface water are required to obtain a NJPDES permit. Farms that operate a NJPDES regulated discharge will incur costs to comply with their NJPDES permit including permit fees, laboratory costs for sample analysis, and potentially costs for engineering services. The total costs imposed will depend on the requirements established in the facility's individual permit which is based on the nature of the operation, the location of the discharge, and the volume and type of pollutants discharged.

In addition, farms that operate a “concentrated animal feeding operation” (CAFO) as described in N.J.A.C. 7:14A-2.13 are required to obtain a NJPDES permit if they discharge to surface water or groundwater. Farms that operate such CAFOs will also incur costs to comply with these rules as incorporated as NJPDES permit condition. The cost of complying with NJPDES permit conditions for CAFOs is variable and depends on a number of factors, including

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number and type of animals confined, existing animal waste practices at the farm, and availability of cropland and pastureland for manure application.

Regulatory Flexibility Analysis

In accordance with the Regulatory Flexibility Act, N.J.S.A. 52:14B-16 *et seq.*, the Department has determined that a limited number of individuals and entities affected by the proposed amendments will be “small businesses” as defined in that Act. The proposed amendments would affect any small businesses engaging in activities that affect the quality or uses of the surface waters of the State through pollutant discharges. As mentioned in the Economic Impact statement above, the initial costs of compliance for water quality sampling, analysis and reporting may increase for small businesses discharging pollutants for which the Department had not previously adopted criteria and pollutants for which the Department is proposing more stringent criteria. Continued costs may include those associated with hiring professional services to design treatment facilities or other measures necessary to comply with the proposed SWQS once they are adopted. For example, a business may hire licensed professional engineers to design best management practices for compliance with the SWQS. The capital and annual compliance costs to small businesses could vary from approximately several thousand dollars to several million dollars, depending on variable factors such as type of activity, classification of the waterbody affected, existing abatement methods, and required levels of pollutant reduction. In proposing these amendments, the Department has balanced the expected economic impacts of the rules upon small businesses against the need to protect the environment and public health while complying with Federal law. The Department has determined that any attempt to relax the requirements for small businesses would endanger safety, public health and the environment. Therefore, no exemption from the rule is specifically provided for small businesses.

Smart Growth

Executive Order No. 4 (2002) requires State agencies which adopt, amend or repeal any rule adopted pursuant to N.J.S.A. 52:14B-4(a) of the Administrative Procedure Act, to describe proposed rule’s impact on the achievement of smart growth and implementation of the New

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Jersey State Development and Redevelopment Plan (SDRP), see N.J.S.A. 52:18A-196 *et seq.* The Department has evaluated this rulemaking to determine the nature and extent of the proposed amendments' impact on smart growth and implementation of the SDRP. Smart growth discourages development where it may impair or destroy natural resources or environmental qualities that are vital to the health and well being of the present and future citizens of New Jersey.

The proposed re-adoption with amendments will likely impact decisions concerning land use and infrastructure development because wastewater discharges will have to meet the proposed antidegradation implementation policies at N.J.A.C. 7:9B-1.5(d). The Category One antidegradation designation requires regulation of discharges to ensure maintenance of Category One water quality. In Category Two waters, the Department has determined those projects in PA1, PA2, and designated centers as well as projects to protect public health and safety, and public institutions are justifiable and necessary. These projects may be eligible for a lowering in water quality. All other types of projects will be required to maintain water quality unless the cost to maintain existing water quality will result in substantial economic impact. The same surface water quality criteria apply in Category One and Category Two streams. The additional protection provided by the Category One antidegradation designation will prevent degradation of existing water quality.

The amendments, primarily intended to conserve the State's surface waters and natural resources, implement State Planning Goal 4: Protect the Environment. Goal 4 provides that "A clean, safe, and attractive environment is essential to assuring the health of our citizens. Sustainable supplies of clean water, clean air and an abundance of open space and recreational opportunities also will assure a sustainable economy." The implementing strategy is to "Protect the environment by planning for growth in compact forms, at locations and densities of use that make efficient use of existing and planned infrastructure and by increasing infrastructure capacities and growth potential in areas where development will not damage water resources, critical habitats or important forests" The proposed amendments advance the goals of the

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plan by protecting the waters from unnecessary amounts of toxic substances, thereby ensuring a sustainable supply of water, support for unique flora/fauna, and other selected water resources.

The SWQS will discourage development where it would impair or destroy natural resources and environmental qualities vital to the health and well-being of the citizens of New Jersey, consistent with Executive Order No. 114 (1994), Executive Order No. 4 (2002), and Executive Order No. 38 (2002).

Full text of the proposal follows (additions indicated in boldface **thus**; deletions indicated in brackets [thus]):

7:9B-1.4 Definitions

...

"Best management practices" or "BMPs" means the methods, measures, or practices to prevent or reduce the amount of pollution from point or non-point sources, including structural and nonstructural controls, and operation and maintenance procedures.

...

"Calculable changes" means **detectable changes including predicted** changes [to] **in** water quality **that fall outside of the 95% confidence interval of the mean water quality** [characteristics as demonstrated by any acceptable mathematical, predictive method] **based on an acceptable mathematical predictive model or sampling and analysis conducted in accordance with USEPA approved methods as identified in 40 CFR 136 or other methods approved by the Department.**

...

"Carcinogen" means a toxic substance capable of inducing a cancer response, including Group A (human carcinogen), Group B (probable human carcinogen) or Group C (possible human carcinogen) categorized in accordance with the USEPA Guidelines for

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Carcinogen Risk Assessment, 51 Fed. Reg. 33992, 1986 incorporated herein by reference, as amended or supplemented.

...

"Category one waters" means those waters designated in the tables in N.J.A.C. 7:9B-1.15(c) through (h), for purposes of implementing the antidegradation policies set forth at N.J.A.C. 7:9B-1.5(d), for protection from [measurable] **calculable** changes in water quality characteristics because of their clarity, color, scenic setting, other characteristics of aesthetic value, exceptional ecological significance, exceptional recreational significance, exceptional water supply significance, or exceptional fisheries resource(s). These waters may include, but are not limited to:

1. -5. (No Change.)

...

["Epilimnion" means the freely circulating upper region of a thermally stratified waterbody extending from the surface to the thermocline.]

...

["Hypolimnion" means the lower region of a stratified waterbody that extends from the thermocline to the bottom of the waterbody, and is isolated from circulation with the upper waters, thereby receiving little or no oxygen from the atmosphere.]

...

["Measurable changes" means changes measured or determined by a biological, chemical, physical, or analytical method, conducted in accordance with USEPA approved methods as identified in 40 C.F.R. 136 or other analytical methods (for example, mathematical models, ecological indices) approved by the Department, that might adversely impact a water use (including, but not limited to, aesthetics).]

...

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“Necessary and justifiable social or economic development” means:

- (1) Projects located in Planning Areas 1 and 2, or in designated centers as mapped on the State Plan Policy Map adopted and amended in accordance with the State Planning Rules, N.J.A.C. 5:85, and the State Planning Act, N.J.S.A. 52:18A-196 et seq.**
- (2) projects to protect public health and safety; or**
- (3) new or expanded public institutions, including, but not limited to, schools, hospitals, and rehabilitation centers.**

...

“Non-carcinogen” means a toxic substance not categorized as a carcinogen, including Group D (not classifiable as to human carcinogenicity) or Group E (evidence of non-carcinogenicity for humans) categorized in accordance with the USEPA Guidelines for Carcinogen Risk Assessment, 51 Fed. Reg. 33992, 1986 incorporated herein by reference, as amended or supplemented.

...

“Substantial Economic Impact” means the cost of a proposed project exceeds the community or facility's ability to pay for the project. The economic impact is determined by a financial analysis conducted on a proposed pollution control project in accordance with USEPA guidance (Interim Economic Guidance for Water Quality Standards Workbook. EPA-823-B-95-002, March 1995, as amended and supplemented, incorporated herein by reference).

...

“Water effect ratio” or “WER” means the ratio of an acute (or chronic) toxicity value derived from a site study to the acute (or chronic) toxicity value derived from a laboratory study for a particular toxic substance. The WER is multiplied by the aquatic life protection criterion for a given toxic substance to derive a site-specific aquatic life protection criterion.

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...

7:9B-1.5 Statements of policy

(a) General policies are as follows:

1. - 4. (No Change.)
5. The introduction of carcinogenic, mutagenic, or teratogenic substances into the environment is of particular concern to the Department. Human health-based ambient criteria have been established [for carcinogenic substances] **in freshwaters due to consumption of fish and water, and in saline water due to consumption of fish. For carcinogens, the criteria have been established** at levels which would result in no greater than a one-in-one-million lifetime excess cancer risk. [for Group A and B carcinogens, under exposure assumptions appropriate for the designated uses of the waterbody. Criteria for Group C carcinogens, for which reference doses are not available, have been established at levels which would result in no greater than a one-in-one-hundred thousand lifetime excess cancer risk.] **For non-carcinogens, the criteria have been established which would result in no appreciable risk of deleterious effect.**

6. - 7. (No Change.)

(b) Interstate waters policies are as follows:

1. The designated uses and water quality criteria for the fresh and saline waters under the jurisdiction of the Delaware River Basin Commission shall be as established in accordance with N.J.A.C. 7:9B-1.13, 1.14(c) [, and 1.14(d)] **through (g).**
2. The designated uses and water quality criteria for waters under the jurisdiction of the Interstate [Sanitation] **Environmental** Commission in the New Jersey/New York metropolitan area shall be as established in this subchapter, or in accordance with the prevailing Water Quality Regulations of the Interstate [Sanitation] **Environmental** Commission, including all amendments and future supplements thereto, whichever are more stringent.

(c) General technical policies are as follows:

1. (No Change.)

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2. Water quality criteria are expected to be maintained during periods when nontidal or small tidal stream flows are at or greater than **the MA7CD10 flow, except as provided below:** [the appropriate design flow. For carcinogenic effect-based human health criteria, toxic substances with a bioaccumulation or bioconcentration factor greater than 200 Liters/kilogram (L/kg) (as listed at 1.5(c)2i below) and for bromodichloromethane (BDCM), the design flow shall be the flow which is exceeded 75 percent of the time for the appropriate “period of record” as determined by the United States Geological Survey (USGS). For acute aquatic life protection criteria, the design flow shall be the MA1CD10 flow. For chronic aquatic life protection criteria for ammonia, the design flow shall be the MA30CD10 flow. The design flow for all other criteria shall be the MA7CD10 flow.

i. Toxic substances having carcinogenic effect-based human health criteria and with a bioaccumulation or bioconcentration factor greater than 200 L/kg are as follows:

- (1) Aldrin;
- (2) Chlordane;
- (3) 4,4'-DDD (p,p'-TDE);
- (4) 4,4'-DDE;
- (5) 4,4'-DDT;
- (6) 3,3'-Dichlorobenzidene;
- (7) Dieldrin;
- (8) Heptachlor;
- (9) Heptachlor epoxide;
- (10) Hexachlorobenzene;
- (11) Polychlorinated biphenyls (PCBs);
- (12) 2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD); and
- (13) Toxaphene.]

i. For acute aquatic life protection criteria, the design flow shall be the MA1CD10 flow;

ii. For chronic aquatic life protection criteria for ammonia, the design flow shall be the MA30CD10 flow; and

iii. For human health criteria for toxic substances listed below, the design flow shall be the flow which is exceeded 75 percent of the time for the appropriate “period of record” as determined by the United States Geological Survey.

(1) Aldrin;

(2) Chlordane;

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- (3) Bromodichloromethane (BDCM);
- (4) 4,4'-DDD (p,p'-TDE);
- (5) 4,4'-DDE;
- (6) 4,4'-DDT;
- (7) 3,3'-Dichlorobenzidene;
- (8) Dieldrin;
- (9) Heptachlor;
- (10) Heptachlor epoxide;
- (11) Hexachlorobenzene;
- (12) Polychlorinated biphenyls (PCBs);
- (13) 2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD); and
- (14) Toxaphene.

3. - 6. (No Change.)

7. The Department shall utilize a geometric mean to assess compliance with the bacterial quality indicators at N.J.A.C.7:9B-1.14(d)1ii-iii. The geometric mean shall be calculated using a minimum of five samples collected over a thirty-day period. The single sample maximum shall be used for beach notification in accordance with N.J.A.C. 8:26 and to identify where additional ambient water quality sampling is needed to calculate a geometric mean.

8. Temperature criteria at N.J.A.C. 7:9B-1.14(d) apply unless an alternative effluent limitation is approved in accordance with Section 316(a) of the Clean Water Act, 33 U.S.C. 1326(a).

i. Properly treated wastewater discharge shall be deemed in compliance with the temperature criteria if the ambient stream temperature measured outside the regulatory heat dissipation area does not increase by more than:

(1) 0.6°C (1°F) in FW2-TP waters

(2) 1.1°C (2°F) in FW2-TM waters

(3) 2.8°C (5°F) in FW2-NT waters

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(4) 2.2°C (4°F) in SE and SC waters from September through May

(5) 0.8°C (1.5°F) in SE and SC waters from June through August

ii. Thermal alterations to lakes, pond, or reservoirs shall not be permitted unless it can be shown to be beneficial to the designated and existing uses.

(d) Antidegradation policies **applicable to all surface waters of the State** are as follows:

1. [These antidegradation policies apply to all surface waters of the State.] **The antidegradation policies shall maintain existing uses and water quality where the existing water quality is better than water quality criteria.**

[2] **i.** Existing uses shall be maintained and protected. Designated uses shall be maintained or, as soon as technically and economically feasible, be attained wherever these uses are not precluded by natural conditions. **The maintenance, migration, and, as appropriate, propagation of threatened or endangered species (as defined under the Federal Endangered Species Act of 1973 as amended, 16 U.S.C. 1531 et seq., and/or the New Jersey Endangered and Nongame Species Conservation Act N.J.S.A. 23:2A-1 et seq.) is considered an existing use that must be maintained.**

[3. - 4.] **ii. - iii.** (No Change in Text.)

iv. Where a lower classification of water (including the antidegradation designation) may impinge upon a higher classification of water, the Department shall ensure that the quality and uses of the higher classification water are protected.

v. A waterway or waterbody from which raw water is transferred to another waterway or waterbody shall be treated as a tributary to the waterway or waterbody receiving the transferred water.

vi. Modifications of water quality-based effluent limitations established to implement the antidegradation policy may be granted pursuant to N.J.A.C. 7:9B-1.8 and 1.9.

vii. Antidegradation policies may be applied during one or more regulatory phases including water quality planning (under N.J.A.C. 7:15), TMDL development (under N.J.A.C. 7:15), or any of the Department's permitting programs.

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2. The waters of the State are assigned antidegradation designations pursuant to N.J.A.C.

7:9B-1.15. Antidegradation policies applicable to a waterbody based upon its antidegradation designation are as follows:

- i. FW1 waters shall be maintained in their natural state (set aside for posterity) and shall not be subject to any manmade wastewater discharges or increases in runoff from anthropogenic activities. The Department shall not approve any activity which, alone or in combination with any other activities, might cause changes, other than toward natural water quality, in the existing surface water quality characteristics.**
- ii. For Pinelands waters, the Department shall not approve any activity which alone or in combination with any other activities, might cause changes, other than toward natural water quality, in the existing surface water quality characteristics. This policy shall apply as follows:**
 - (1) This policy is not intended to interfere with water control in the operation of cranberry bogs or blueberry production.**
 - (2) Dischargers holding valid NJPDES permits as of May 20, 1985, shall be allowed to continue discharging under the terms of their existing NJPDES permits provided that the discharge is not creating any water quality problems and that the designated uses are being attained. If a water quality problem has been created or the designated uses are not being attained, the NJPDES permit shall be modified to eliminate the water quality problem or attain the designated uses.**
 - (3) Existing dischargers shall be subject to all the provisions of this subchapter when they apply for modification or expansion of their existing discharge.**
- iii. Category One Waters shall be protected from any calculable changes to the existing water quality. Water quality characteristics that are generally worse than the water quality criteria, except as due to natural conditions, shall be improved to meet water quality criteria and maintain or provide for the designated uses where this can be accomplished without adverse impacts to organisms, communities or ecosystems of concern.**
- iv. For Category Two Waters, water quality characteristics that are generally better than, or equal to the water quality standards shall be maintained within a range of quality**

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that protects the existing and designated uses. Water quality characteristics that are generally worse than the water quality criteria, except when due to natural conditions, shall be improved to meet the water quality criteria.

- [5. Where water quality exceeds levels necessary to support the designated uses, including but not limited to, propagation of fish, shellfish, and wildlife and recreation in and on the water, that quality shall be maintained and protected unless the Department finds, after full satisfaction of the intergovernmental coordination and public participation provisions of the Department's continuing planning process as set forth in the Statewide Water Quality Management Plan (see N.J.A.C. 7:15), which includes, but is not limited to, the NJPDES Regulations (N.J.A.C. 7:14A), that allowing lower water quality is necessary to accommodate important economic or social development in the area in which the waters are located.
6. These antidegradation policies shall be applied as follows:
- i. The quality of Nondegradation waters shall be maintained in their natural state (set aside for posterity) and shall not be subject to any manmade wastewater discharges. The Department shall not approve any activity which, alone or in combination with any other activities, might cause changes, other than toward natural water quality, in the existing surface water quality characteristics.
 - ii. For Pinelands waters, the Department shall not approve any activity which alone or in combination with any other activities, might cause changes, other than toward natural water quality, in the existing surface water quality characteristics. This policy shall apply as follows:
 - (1) This policy is not intended to interfere with water control in the operation of cranberry bogs or blueberry production.
 - (2) Dischargers holding valid NJPDES permits as of May 20, 1985, shall be allowed to continue discharging under the terms of their existing NJPDES permits provided that the discharge is not creating any water quality problems and that the designated uses are being attained. If a water quality problem has been created or the designated uses are not being attained, the NJPDES permit shall be modified to eliminate the water quality problem or attain the designated uses.

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- (3) Existing dischargers shall be subject to all the provisions of this subchapter when they apply for modification or expansion of their existing discharge.
- iii. Category One Waters shall be protected from any measurable changes (including calculable or predicted changes) to the existing water quality. Water quality characteristics that are generally worse than the water quality criteria, except as due to natural conditions, shall be improved to maintain or provide for the designated uses where this can be accomplished without adverse impacts on organisms, communities or ecosystems of concern.
- iv. For Category Two Waters, water quality characteristics that are generally better than, or equal to, the water quality standards shall be maintained within a range of quality that shall protect the existing/designated uses, as determined by studies acceptable to the Department, relating existing/designated uses to water quality. Where such studies are not available or are inconclusive, water quality shall be protected from changes that might be detrimental to the attainment of the designated uses or maintenance of the existing uses. Water quality characteristics that are generally worse than the water quality criteria shall be improved to meet the water quality criteria.]

3. Activities not subject to antidegradation review:

- i. Short term, temporary (not to exceed six months) lowering of water quality which will not result in long term or permanent changes to the aquatic ecosystem, including, but not limited to, bank/sediment stabilization projects; establishment of buffer zones; scientific study or research; and repairs to existing roads, bridges, dams, or other infrastructure.**
- ii. Emergency response actions undertaken to remediate a discharge into the environment of hazardous substances which may pose an imminent and substantial danger to public health, welfare, and environment.**
- iii. Site remediation actions which have the net effect of improving surface water quality by reducing existing or impending net loading of pollutants to a waterbody which is currently or would eventually be affected.**
- iv. Transfers of water for water supply purposes approved by the Department.**
- v. The following NJPDES permit actions:**

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(1) Permit renewals that do not authorize an increase in permitted flow or pollutant loadings;

(2) Discharges authorized by a NJPDES general permit issued pursuant to N.J.A.C. 7:14A-6.13 after (the effective date).

4. Antidegradation policies for new or expanded point source discharges regulated pursuant to N.J.A.C. 7:14A shall be implemented as follows:

i. The applicant shall perform an alternatives analysis to determine if other options are available to prevent or minimize the lowering of water quality. The applicant shall consider all feasible non-discharge alternatives including relocation of the outfall and connection to another treatment plant; alternative treatment technologies available to minimize the lowering of water quality; and modifications to the existing treatment system.

ii. If the Department determines there are no alternatives to a surface water discharge, the applicant may be required to conduct a water quality study to establish effluent limitations for the identified pollutants which could result in a lowering of water quality.

(1) For existing discharges, the applicant shall evaluate existing effluent data and current plant performance to identify those pollutants that may increase as a result of the expansion.

(2) For new discharges, the applicant shall utilize effluent data from a similar facility taking into account the size, treatment, and water supply source.

iii. In Category One waters the discharge is consistent with the antidegradation policies if it does not result in calculable change in water quality.

iv. In Category Two waters, the discharge is consistent with the antidegradation policies if:

(1) The proposed new or expanded discharge will not result in a calculable change in water quality;

(2) The proposed new or expanded discharge to Highlands open waters, as defined at N.J.S.A. 13:20-3, within the Preservation Area of the Highlands Water Protection and

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Planning Act (N.J.S.A. 13:20-1 et seq.) will not result in a calculable change in water quality; or

(3) The proposed project qualifies as a necessary and justifiable social or economic development or the cost to prevent the lowering of water quality would result in substantial economic impact. For projects qualifying under this provision, a lowering of water quality may be allowed provided that the existing and designated uses will be maintained and protected. The Department shall determine the extent of lowering water quality based upon:

(i) the type of project and the anticipated public benefit from the project;

(ii) the predicted in-stream water quality based upon treatment options;

(iii) the cost of treatment; and

(iv) environmental impacts associated with each treatment option.

[7. Where a lower classification of water (including the different antidegradation waters) may impinge upon a higher classification of water the Department shall ensure that the quality and uses of the higher classification water are protected.

8. A waterway or waterbody from which raw water is transferred to another waterway or waterbody shall be treated as a tributary to the waterway or waterbody receiving the transferred water.

9. Modifications of water quality-based effluent limitations established to implement this antidegradation policy may be granted pursuant to N.J.A.C. 7:9B-1.8 and 1.9.]

(e) Water quality-based effluent limitation policies are as follows:

1. - 6. (No Change.)

7. The Department may require characterization monitoring in NJPDES permits for mercury and PCBs using the USEPA approved method 1631 for mercury (Guidelines Establishing Test Procedures for the Analysis of Pollutants; Measurement of Mercury in Water; Revisions to EPA Method 1631, 40 C.F.R. 136, Fed. Reg. 67:65876, October 29, 2002) as supplimented and amended and 1668A for PCBs (Method 1668, Revision A: Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by HRGC/HRMS. EPA-821-R-00-002, December 1999) as supplimented and amended.

(f) - (g) (No Change.)

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(h) A permittee may request that a regulatory mixing zone be established by the Department for applicable criteria except as otherwise provided in this section. Regulatory mixing zones may be evaluated as part of the development of water quality-based effluent limitation(s) to provide for the initial dispersion of the effluent in the receiving water body at or near the discharge point.

1. (No Change.)
2. Spatial limitations for regulatory mixing zones delineate the maximum area in which the initial mixing may occur. A site-specific study performed in accordance with (h)3 below will be used to determine dilution in tidal water bodies and in nontidal water bodies where mixing is not shown to be rapid and complete. A maximum area shall be applied in any one of the following four situations:
 - i. Heat dissipation areas **shall be established as follows:** [as provided at N.J.A.C. 7:9B-1.14(c) 11.ii. or a variance issued pursuant to Section 316(a) of the Clean Water Act, 33 U.S.C. 1326(a).]

(1) For discharges to FW2-NT, FW2-TM, and SE waters, not more than one-quarter (1/4) of the cross section and/or volume of the water body at any time or more than two-thirds (2/3) of the surface from shore to shore at any time.

(2) For discharges to lakes, ponds, reservoirs, bays or coastal waters, the heat dissipation areas shall be developed on a case-by-case basis.

(3) A discharger may be granted a larger heat dissipation area pursuant to 33 U.S.C. 1326(a) Section 316(a) of the Clean Water Act.

ii. - iv. (No Change.)

3. - 5. (No Change.)

7:9B-1.6 Establishment of water quality-based effluent limitations

(a) For Category One waters, as defined in N.J.A.C. 7:9B-1.4, water quality-based effluent limitations shall be assigned to a point source discharge so as to protect the existing water quality from any [measurable or] calculable changes. The Department shall establish water quality-based effluent limitations, as appropriate, for those parameters contained in N.J.A.C. 7:9B-1.14, as well as any other parameters the Department believes may have a detrimental effect on the designated or existing uses.

(b) (No Change.)

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- (c) Water quality-based effluent limits for chlorine produced oxidants based on the criteria in N.J.A.C. 7:9B-1.14 [(c)14] **(f)** are not applicable where:
1. - 3. (No Change.)

7:9B-1.14 Surface water quality criteria

- (a) (No Change.)
 - (b) Surface water quality criteria for PL waters are as follows:
 1. (No Change.)
 2. The water quality criteria for existing discharges are the water quality criteria contained in "Surface Water Quality Standards" as adopted in March 1981, except that:
 - i. (No Change.)
 - ii. The criteria for phosphorous, **bacterial quality**, and toxic substances promulgated in N.J.A.C. 7:9B-1.14(c) **through (g)** apply instead of the 1981 criteria, as though the freshwater portions of the PL waters were classified as FW2 and the saline portions were classified as SE1.
- (c) Unless site-specific criteria are established at (g) below, State-wide criteria apply for FW2, SE, and SC waters as listed in accordance with (d) through (f) below.**

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[(c)] **(d)** Surface Water Quality Criteria for FW2, SE and SC Waters:

7:9B-1.14(d) General Surface Water Quality Criteria for FW2, SE and SC Waters:
(Expressed as Maximum concentrations unless otherwise noted)

Substance	Criteria	Classifications
1. Bacterial quality (Counts/100 ml)	i. Shellfish Harvesting: Bacterial Indicators shall not exceed, in all shellfish waters, the standard for approved shellfish waters as established by the National Shellfish Sanitation Program as set forth in its current manual of operations.	Shellfish Waters
	[ii. Fecal Coliforms:	
	(1) Fecal coliform levels shall not exceed a geometric average of 50/100 ml.	[Within 1500 feet of shoreline in SC waters.
	(2) Fecal coliform levels shall not exceed a geometric average of 200/100 ml nor should more than 10 percent of the total samples taken during any 30-day period exceed 400/100 ml.	FW2, SE1, and SC 1500 feet to 3 miles from the shoreline.
	(3) Fecal coliform levels shall not exceed a geometric average of 770/100 ml.	SE2
	(4) Fecal coliform levels shall not exceed a geometric average of 1500/100ml.	SE3
	iii. Enterococci:	
	(1) Enterococci levels shall not exceed a geometric mean of 33/100 ml, nor shall any single sample exceed 61/100 ml.	FW2
	(2) Enterococci levels shall not exceed a geometric mean of 35/100 ml, nor shall any single sample exceed 104/100 ml.]	SE1 and SC]
	ii. Primary Contact Recreation:	
	<u>(1) Enterococci levels shall not exceed a geometric mean of 35/100 ml, or a single sample maximum of 104/100 ml.</u>	<u>SE1 and SC</u>
	<u>(2) E. Coli levels shall not exceed a geometric mean of 126/100 ml or a single sample maximum of 235/100 ml.</u>	<u>All FW2</u>
	iii. Secondary Contact Recreation:	
	<u>(1) Fecal coliform levels shall not exceed a geometric mean of 770/100 ml.</u>	<u>SE2</u>
	<u>(2) Fecal coliform levels shall not exceed a geometric mean of 1500/100ml.</u>	<u>SE3</u>

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- [iv. Samples shall be obtained at sufficient frequencies and at locations during periods which will permit valid interpretation of laboratory analyses. As a guideline and for the purpose of these regulations, a minimum of five samples as equally spaced over a 30-day period, as feasible, should be collected; however, the number of samples, frequencies and locations will be determined by the Department or other appropriate agency in any particular case.] [All Classifications]
2. - 10. (No Change.)
11. Temperature [and Heat Dissipation Areas]
- [i. Thermal Alterations (Temperatures shall be measured outside of heat dissipation areas)
- (1) Streams
- (i) No thermal alterations which would cause changes in ambient temperatures except where properly treated wastewater effluents are discharged. Where such discharges occur, temperatures shall not deviate more than 0.6°C (1°F) from ambient temperature. [FW2-TP]
- (ii) No thermal alterations which would cause temperatures to exceed ambient by more than 1.1°C (2°F) at any time or which would cause temperatures in excess of 20°C (68°F). FW2-TM
- (iii) No thermal deviations which would cause temperatures to deviate more than 2.8°C (5°F) at any time from ambient temperatures. No heat may be added which would cause temperatures to exceed 27.8°C (82°F) for small mouth bass or yellow perch waters, or 30°C (86°F) for other nontrout waters. FW2-NT
- (iv) No thermal alterations which would cause temperatures to deviate from ambient by more than 2.2°C (4°F), from September through May, nor more than 0.8°C (1.5°F) from June through August, nor cause temperatures to exceed 29.4°C (85°F).] All SE]
- (i) No thermal alterations which would cause temperatures to exceed 20° C (68° F)** **FW2-TP, FW2-TM**
- (ii) No thermal alterations which would cause temperatures to exceed 27.8° C (82° F)** **FW2-NT (small mouth bass and yellow perch waters)**
- (iii) No thermal alterations which would cause temperatures to exceed 30° C (86° F)** **All other FW2-NT**
- (iv) No thermal alterations which would cause temperatures to exceed 29.4° C (85° F)** **SE**
- (v) No thermal alterations which would cause temperatures to exceed 26.7° C (80° F)** **SC**
- [(2) Lakes, Ponds or Reservoirs]

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- (i) No thermal alterations except where it can be shown to be beneficial to the designated and existing uses. [FW2-TM, FW2-TP]
 - (ii) No thermal alterations of more than 1.7° C (3° F) in the epilimnion of lakes and other standing waters. No discharges of heated effluent into the hypolimnion nor pumping of water from the hypolimnion (for discharge back into the same water body) shall be permitted unless it is demonstrated, to the satisfaction of the Department, that such practices will be beneficial to the existing and designated uses. FW2-NT
 - (3) Saline Bays - No thermal alterations which would cause temperatures to deviate from ambient by more than 2.2° C (4° F), from September through May, nor more than 0.8° C (1.5° F) from June through August, nor cause temperatures to exceed 29.4° C (85° F). All SE
 - (4) Coastal Waters - No direct heat additions within 1,500 feet of the shoreline. No thermal alterations which would cause temperatures to deviate from ambient temperatures by more than 2.2° C (4° F) from September through May, nor more than 0.8° C (1.5° F) from June through August, nor which would cause temperatures to exceed 26.7° C (80° F). SC
 - ii. Heat Dissipation Areas
 - (1) Streams FW2-TM, FW2-NT, All SE
 - (i) Not more than one-quarter (1/4) of the cross section and/or volume of the water body at any time; FW2, SE3
 - (ii) Not more than two-thirds (2/3) of the surface from shore to shore at any time; and
 - (iii) These limits may be exceeded by special permission, on a case-by-case basis, when a discharger can demonstrate that a larger heat dissipation area meets the tests for a waiver under Section 316 of the Federal Clean Water Act.
 - (2) Lakes, Ponds, Reservoirs, Bays or Coastal Waters: Heat dissipation areas will be developed on a case-by-case basis.] All Classifications]
12. (No Change.)

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[7:9B-1.14(c) Surface Water Quality Criteria for FW2, SE and SC Waters
(Expressed as maximum concentrations unless otherwise noted)]

Substance	Criteria	Classifications]
[13. Toxic Substances (µg/L):]		
[NOTE: Except as noted, aquatic life criteria followed by an (a) represent acute aquatic life protection criteria as a one-hour average (three-hour for ammonia, six-hour for lead) and aquatic life criteria followed by (c) represent chronic aquatic life protection criteria as a four-day average (30-day for ammonia). No exceedance of aquatic life criteria shall be permitted at or above the design flows specified in section N.J.A.C. 7:9B-1.5(c)2. Criteria followed by an (h) are noncarcinogenic effect-based human health criteria as a 30-day average with no frequency of exceedance at or above the design flows specified in section N.J.A.C. 7:9B-1.5(c)2. Criteria followed by an (hc) are carcinogenic effect-based human health criteria as a 70-year average with no frequency of exceedance at or above the design flows specified in section N.J.A.C. 7:9B-1.5(c)2 and are based on a risk level of one-in-one-million. Criteria followed by an (hcc) are for toxic substances considered to be possible human carcinogens as a 70-year average with no frequency of exceedance at or above the design flows specified in section N.J.A.C. 7:9B-1.5(c)2 and are based on a risk level of one-in-one hundred thousand. Criteria followed by an (OL) are organoleptic effect-based criteria and are maximum concentrations.]		
i. Acenaphthylene	Reserved.	
ii. Acrolein	(1) 320(h)	All FW2
	(2) 780(h)	All SE, SC
iii. Acrylonitrile	(1) 0.0591(hc)	All FW2
	(2) 0.665(hc)	All SE, SC
iv. Aldrin	(1) 3.0(a); 0.000135(hc)	All FW2
	(2) 1.3(a); 0.000144(hc)	All SE, SC
v. Aluminum (Total recoverable)	Reserved.	

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[7:9B-1.14(c) Surface Water Quality Criteria for FW2, SE and SC Waters
(Expressed as maximum concentrations unless otherwise noted)

Substance	Criteria	Classifications]
vi. Ammonia, un-ionized (mg NH ₃ -N/L)	(1) at pH < 8.30	FW2-TP, FW2-TM
	$0.179 \times 10^{0.026(\text{Temp}-20) + 0.41 (\text{pH}-7.80)}_{(a)}$	
	$0.046 \times 10^{0.026(\text{Temp}-20) + 0.41 (\text{pH}-7.80)}_{(c)}$	
	at pH ≥ 8.30	
	$0.179 \times 10^{0.026(\text{Temp}-20) + 0.20}_{(a)}$	
	$0.046 \times 10^{0.026(\text{Temp}-20) + 0.20}_{(c)}$	
	(2) at pH < 8.30	FW2-NT
	$0.201 \times 10^{0.026(\text{Temp}-20) + 0.41 (\text{pH}-7.80)}_{(a)} (\text{Summer}^1)$	
	$0.054 \times 10^{0.026(\text{Temp}-20) + 0.41 (\text{pH}-7.80)}_{(c)} (\text{Summer}^1)$	
	$0.232 \times 10^{0.026(\text{Temp}-20) + 0.41 (\text{pH}-7.80)}_{(a)} (\text{Winter}^2)$	
	$0.060 \times 10^{0.026(\text{Temp}-20) + 0.41 (\text{pH}-7.80)}_{(c)} (\text{Winter}^2)$	
	at pH ≥ 8.30	
	$0.201 \times 10^{0.026(\text{Temp}-20) + 0.20}_{(a)} (\text{Summer}^1)$	
	$0.054 \times 10^{0.026(\text{Temp}-20) + 0.20}_{(c)} (\text{Summer}^1)$	
	$0.232 \times 10^{0.026(\text{Temp}-20) + 0.20}_{(a)} (\text{Winter}^2)$	
$0.060 \times 10^{0.026(\text{Temp}-20) + 0.20}_{(c)} (\text{Winter}^2)$		
(3) at pH < 8.30	PL	
$0.238 \times 10^{0.026(\text{Temp}-20) + 0.41 (\text{pH}-7.80)}_{(a)}$		
$0.061 \times 10^{0.026(\text{Temp}-20) + 0.41 (\text{pH}-7.80)}_{(c)}$		
at pH ≥ 8.30		
$0.238 \times 10^{0.026(\text{Temp}-20) + 0.20}_{(a)}$		
$0.061 \times 10^{0.026(\text{Temp}-20) + 0.20}_{(c)}$		
(4) 0.115(a)	All SE	
0.030(c)		
(5) 0.094(a)	SC	
0.024(c)		

1 Summer spawning period from March 1st through October 31st.

2 Winter non-spawning period from November 1st through February 28/29th.

Substance	Criteria	Classifications
vii. Anthracene	(1) 9,570(h)	All FW2
	(2) 108,000(h)	All SE, SC
viii. Antimony (Total recoverable)	(1) 12.2(h)	All FW2
	(2) 4,300(h)	All SE, SC
ix. Arsenic (Total recoverable)	(1) 0.0170(hc)	All FW2
	(2) 0.136(hc)	All SE, SC

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[7:9B-1.14(c) Surface Water Quality Criteria for FW2, SE and SC Waters
(Expressed as maximum concentrations unless otherwise noted)

Substance	Criteria	Classifications]
x. Asbestos	(1) 7 million fibers/L (h) (fibers longer than 10 micrometers)	All FW2
xi. Barium (Total recoverable)	(1) 2,000(h)	All FW2
xii. Benz(a)anthracene	(1) 0.0028(hc) (2) 0.031(hc)	All FW2 All SE, SC
xiii. Benzene	(1) 0.150(hc) (2) 71(hc)	All FW2 All SE, SC
xiv. Benzidine	(1) 0.000118(hc) (2) 0.000535(hc)	All FW2 All SE, SC
xv. 3,4-Benzofluoranthene (Benzo(b)fluoranthene)	(1) 0.0028(hc) (2) 0.031(hc)	All FW2 All SE, SC
xvi. Benzo(a)pyrene (BaP)	(1) 0.0028(hc) (2) 0.031(hc)	All FW2 All SE, SC
xvii. Benzo(ghi)perylene	Reserved.	
xviii. Benzo(k)fluoranthene	(1) 0.0028(hc) (2) 0.031(hc)	All FW2 All SE, SC
xix. Beryllium (Total recoverable)	Reserved.	
xx. alpha-BHC (alpha-HCH)	(1) 0.00391(hc) (2) 0.0131(hc)	All FW2 All SE, SC
xxi. beta-BHC (beta-HCH)	(1) 0.137(hcc) (2) 0.460(hcc)	All FW2 All SE, SC
xxii. gamma-BHC (gamma-HCH/Lindane)	(1) 2.0(a); 0.080(c) (2) 0.16(a)	All FW2 All SE, SC
xxiii. Bis(2-chloroethyl) ether	(1) 0.0311(hc) (2) 1.4(hc)	All FW2 All SE, SC
xxiv. Bis(2-chloroisopropyl) ether	(1) 1,250(h) (2) 170,000(h)	All FW2 All SE, SC
xxv. Bis(2-ethylhexyl) phthalate	(1) 1.76(hc) (2) 5.92(hc)	All FW2 All SE, SC
xxvi. Bromodichloromethane (Dichlorobromomethane)	(1) 0.266(hc) (2) 22(hc)	All FW2 All SE, SC
xxvii. Bromoform	(1) 4.38(hc) (2) 360(hc)	All FW2 All SE, SC

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[7:9B-1.14(c) Surface Water Quality Criteria for FW2, SE and SC Waters
(Expressed as maximum concentrations unless otherwise noted)

Substance	Criteria	Classifications]
xxviii. Butyl benzyl phthalate	(1) 239(h)	All FW2
	(2) 416(h)	All SE, SC
xxix. Cadmium (Total recoverable)	(1) 10(h)	All FW2
xxx. Carbon tetrachloride	(1) 0.363(hc)	All FW2
	(2) 6.31(hc)	All SE, SC
xxxi. Chlordane	(1) 2.4(a); 0.0043(c); 0.000277(hc)	All FW2
	(2) 0.09(a); 0.0040(c); 0.000283(hc)	All SE, SC
xxxii. Chloride	(1) 250,000 (ol); 860,000(a); 230,000(c)	All FW2
xxxiii. Chlorine Produced Oxidants (CPO)	(1) 19(a); 11(c)	All FW2
	(2) 13(a); 7.5(c)	All SE, SC
xxxiv. Chlorobenzene	(1) 22.0(h)	All FW2
	(2) 21,000(h)	All SE, SC
xxxv. Chloroform	(1) 5.67(hc)	All FW2
	(2) 470(hc)	All SE, SC
xxxvi. 2-Chlorophenol	(1) 122(h)	All FW2
	(2) 402(h)	All SE, SC
xxxvii. Chlorpyrifos	(1) 0.083(a); 0.041(c)	All FW2
	(2) 0.011(a); 0.0056(c)	All SE, SC
xxxviii. Chromium (Total recoverable)	(1) 160(h)	All FW2
	(2) 3,230(h)	All SE, SC
xxxix. Chrysene	(1) 0.0028(hc)	All FW2
	(2) 0.031(hc)	All SE, SC
xl. Copper (Dissolved)	(1) Reserved.	
	(2) Reserved.	
	(3) 7.9(a); 5.6(c)	New York/New Jersey Harbor Estuary*
xli. Cyanide	(1) 22(a); 5.2(c); 768(h)	All FW2
	(2) 1.0(a); 1.0(c); 220,000(h)	All SE, SC
xlii. 4,4'-DDD (p,p'-TDE)	(1) 0.000832(hc)	All FW2
	(2) 0.000837(hc)	All SE, SC
xliii. 4,4'-DDE	(1) 0.000588(hc)	All FW2
	(2) 0.000591(hc)	All SE, SC

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[7:9B-1.14(c) Surface Water Quality Criteria for FW2, SE and SC Waters

(Expressed as maximum concentrations unless otherwise noted)

Substance	Criteria	Classifications]
xliv. 4,4'-DDT	(1) 1.1(a); 0.0010(c); 0.000588(hc)	All FW2
	(2) 0.13(a); 0.0010(c); 0.000591(hc)	All SE, SC
xlv. Demeton	(1) 0.1(c)	All FW2, SE, and SC
xlvi. Dibenz(a,h)anthracene	(1) 0.0028(hc)	All FW2
	(2) 0.031(hc)	All SE, SC
xlvii. Dibromochloromethane (Chlorodibromomethane)	(1) 72.6(h)	All FW2
xlviii. Di-n-butyl phthalate	(1) 3,530(h)	All FW2
	(2) 15,700(h)	All SE, SC
xlix. 1,2-Dichlorobenzene	(1) 2,520(h)	All FW2
	(2) 16,500(h)	All SE, SC
l. 1,3-Dichlorobenzene	(1) 2,620(h)	All FW2
	(2) 22,200(h)	All SE, SC
li. 1,4-Dichlorobenzene	(1) 343(h)	All FW2
	(2) 3,159(h)	All SE, SC
lii. 3,3'-Dichlorobenzidine	(1) 0.0386(hc)	All FW2
	(2) 0.0767(hc)	All SE, SC
liii. 1,2-Dichloroethane	(1) 0.291(hc)	All FW2
	(2) 99(hc)	All SE, SC
liv. 1,1-Dichloroethylene	(1) 4.81(h)	All FW2
lv. trans-1,2-Dichloroethylene	(1) 592(h)	All FW2
lvi. 2,4-Dichlorophenol	(1) 92.7(h)	All FW2
	(2) 794(h)	All SE, SC
lvii. 1,3-Dichloropropene	(1) 0.193(hc)	All FW2
	(2) 1,700(h)	All SE, SC
lviii. Dieldrin	(1) 2.5(a); 0.0019(c); 0.000135(hc)	All FW2
	(2) 0.71(a); 0.0019(c); 0.000144(hc)	All SE, SC
lix. Diethyl phthalate	(1) 21,200(h)	All FW2
	(2) 111,000(h)	All SE, SC
lx. Dimethyl phthalate	(1) 313,000(h)	All FW2
	(2) 2,900,000(h)	All SE, SC
lxi. 4,6-Dinitro-o-cresol	(1) 13.4(h)	All FW2
	(2) 765(h)	All SE, SC

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[7:9B-1.14(c) Surface Water Quality Criteria for FW2, SE and SC Waters

(Expressed as maximum concentrations unless otherwise noted)

Substance	Criteria	Classifications]
lxii. 2,4-Dinitrophenol	(1) 69.7(h)	All FW2
	(2) 14,000(h)	All SE, SC
lxiii. 2,4-Dinitrotoluene	(1) 0.11(hc)	All FW2
	(2) 9.1(hc)	All SE, SC
lxiv. 1,2-Diphenylhydrazine	(1) 0.0405(hc)	All FW2
	(2) 0.541(hc)	All SE, SC
lxv. Endosulfans (alpha and beta)	(1) 0.22(a); 0.056(c); 0.932(h)	All FW2
	(2) 0.034(a); 0.0087(c); 1.99(h)	All SE, SC
lxvi. Endosulfan sulfate	(1) 0.93(h)	All FW2
	(2) 2.0(h)	All SE, SC
lxvii. Endrin	(1) 0.18(a); 0.0023(c); 0.629(h)	All FW2
	(2) 0.037(a); 0.0023(c); 0.678(h)	All SE, SC
lxviii. Endrin aldehyde	(1) 0.76(h)	All FW2
	(2) 0.81(h)	All SE, SC
lxix. Ethylbenzene	(1) 3,030(h)	All FW2
	(2) 27,900(h)	All SE, SC
lxx. Fluoranthene	(1) 310(h)	All FW2
	(2) 393(h)	All SE, SC
lxxi. Fluorene	(1) 1,340(h)	All FW2
lxxii. Guthion	(1) 0.01(c)	All FW2, SE and SC
lxxiii. Heptachlor	(1) 0.52(a); 0.0038(c); 0.000208(hc)	All FW2
	(2) 0.053(a); 0.0036(c); 0.000214(hc)	All SE, SC
lxxiv. Heptachlor epoxide	(1) 0.52(a); 0.0038(c); 0.000103(hc)	All FW2
	(2) 0.053(a); 0.0036(c); 0.000106(hc)	All SE, SC
lxxv. Hexachlorobenzene	(1) 0.000748(hc)	All FW2
	(2) 0.000775(hc)	All SE, SC
lxxvi. Hexachlorobutadiene	(1) 6.94(h)	All FW2
lxxvii. Hexachlorocyclopentadiene	(1) 245(h)	All FW2
	(2) 17,000(h)	All SE, SC
lxxviii. Hexachloroethane	(1) 2.73(h)	All FW2
	(2) 12.4(h)	All SE, SC
lxxix. Indeno(1,2,3-cd)pyrene	(1) 0.0028(hc)	All FW2
	(2) 0.031(hc)	All SE, SC
lxxx. Iron (Total recoverable)	Reserved.	

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[7:9B-1.14(c) Surface Water Quality Criteria for FW2, SE and SC Waters

(Expressed as maximum concentrations unless otherwise noted)

Substance	Criteria	Classifications]
lxxx. Isophorone	(1) 552(h)	All FW2
lxxxii. Lead	(1) 38(a); 5.4(c) (Dissolved); 5(h) (Total recoverable)	All FW2
	(2) 210(a); 24(c) (Dissolved)	All SE, SC
lxxxiii. Malathion	(1) 0.1(c)	All FW2, SE and SC
lxxxiv. Manganese (Total recoverable)	(1) 100(h)	All SE, SC
lxxxv. Mercury (Total recoverable)	(1) 0.144(h)	All FW2
	(2) 0.146(h)	All SE, SC
lxxxvi. Methoxychlor	(1) 0.03(c); 40(h)	All FW2
	(2) 0.03(c)	All SE, SC
lxxxvii. Methyl bromide (Bromomethane)	(1) 48.4(h)	All FW2
	(2) 4,000(h)	All SE, SC
lxxxviii. Methyl chloride (Chloromethane)	Reserved.	
lxxxix. Methylene chloride	(1) 2.49(hc)	All FW2
	(2) 1,600(hc)	All SE, SC
xc. Mirex	(1) 0.001(c)	All FW2, SE and SC
xc. Nickel (Total recoverable)	(1) 516(h)	All FW2
	(2) 3,900(h)	All SE, SC
xcii. Nitrate (as N)	(1) 10,000(h)	All FW2
xciii. Nitrobenzene	(1) 16.0(h)	All FW2
	(2) 1,900(h)	All SE, SC
xciv. N-Nitrosodi-n-butylamine	(1) 0.00641(hc)	All FW2
xcv. N-Nitrosodiethylamine	(1) 0.000233(hc)	All FW2
xcvi. N-Nitrosodimethylamine	(1) 0.000686(hc)	All FW2
	(2) 8.1(hc)	All SE, SC
xcvii. N-Nitrosodiphenylamine	(1) 4.95(hc)	All FW2
	(2) 16.2(hc)	All SE, SC
xcviii. N-Nitrosopyrrolidine	(1) 0.0167(hc)	All FW2
xcix. Parathion	(1) 0.065(a); 0.013(c)	All FW2
c. Pentachlorobenzene	(1) 3.67(h)	All FW2
	(2) 4.21(h)	All SE, SC

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[7:9B-1.14(c) Surface Water Quality Criteria for FW2, SE and SC Waters

(Expressed as maximum concentrations unless otherwise noted)

Substance	Criteria	Classifications]
ci. Pentachlorophenol	(1) $e^{(1.005(\text{pH})-4.830)}(\text{a});$ $e^{(1.005(\text{pH})-5.290)}(\text{c}); 0.282(\text{hc})$	All FW2
	(2) 13(a); 7.9(c); 8.2(hc)	All SE, SC
cii. Phenanthrene	Reserved.	
ciii. Phenol	(1) 20,900(h)	All FW2
	(2) 4,600,000(h)	All SE, SC
civ. Phosphorous (yellow)	(1) 0.1(c)	All SE, SC
cv. Polychlorinated biphenyls (PCBs)	(1) 0.014(c); 0.00017(hc)	All FW2
	(2) 0.030(c); 0.00017(hc)	All SE, SC
cvi. Pyrene	(1) 797(h)	All FW2
	(2) 8,970(h)	All SE, SC
cvii. Selenium (Total recoverable)	(1) 10(h)	All FW2
cviii. Silver (Total recoverable)	(1) 164(h)	All FW2
cix. Sulfide-hydrogen sulfide (undissociated)	(1) 2(c)	All FW2, SE and SC
cx. 1,2,4,5-Tetrachlorobenzene	(1) 2.56(h)	All FW2
	(2) 3.25(h)	All SE, SC
cxi. 2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	(1) 0.000000013(hc)	All FW2
	(2) 0.000000014(hc)	All SE, SC
cxii. 1,1,2,2-Tetrachloroethane	(1) 1.72(hcc)	All FW2
cxiii. Tetrachloroethylene	(1) 0.388(hc)	All FW2
	(2) 4.29(hc)	All SE, SC
cxiv. Thallium (Total recoverable)	(1) 1.70(h)	All FW2
	(2) 6.22(h)	All SE, SC
cxv. Toluene	(1) 7,440(h)	All FW2
	(2) 200,000(h)	All SE, SC
cxvi. Toxaphene	(1) 0.73(a); 0.0002(c); 0.000730(hc)	All FW2
	(2) 0.21(a); 0.0002(c); 0.000747(hc)	All SE, SC
cxvii. 1,2,4-Trichlorobenzene	(1) 30.6(h)	All FW2
	(2) 113(h)	All SE, SC
cxviii. 1,1,1-Trichloroethane	(1) 127(h)	All FW2
cxix. 1,1,2-Trichloroethane	(1) 13.5(h)	All FW2

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[7:9B-1.14(c) Surface Water Quality Criteria for FW2, SE and SC Waters
(Expressed as maximum concentrations unless otherwise noted)

Substance	Criteria	Classifications]
cxx. Trichloroethylene	(1) 1.09(hc) (2) 81(hc)	All FW2 All SE, SC
cxxi. 2,4,5-Trichlorophenol	(1) 2,580(h) (2) 9,790(h)	All FW2 All SE, SC
cxxii. 2,4,6-Trichlorophenol	(1) 2.14(hc) (2) 6.53(hc)	All FW2 All SE, SC
cxxiii. Vinyl chloride	(1) 0.0830(hc) (2) 525(hc)	All FW2 All SE, SC
cxxiv. Zinc (Total recoverable)	Reserved.	
14. Turbidity (Nephelometric Turbidity Unit-NTU)	i. Maximum 30-day average of 15 NTU, a maximum of 50 NTU at any time. ii. Maximum 30-day average of 10 NTU, a maximum of 30 NTU at any time. iii. Levels shall not exceed 10.0 NTU.	FW2, SE3 SE1, SE2 SC]

[* Waters which include Newark Bay, the New Jersey portions of Raritan Bay, Upper New York Bay, Lower New York Bay, Arthur Kill, Kill Van Kull, saline portions of the Passaic, Hackensack, and Hudson Rivers and saline portions of tributaries to all of these waters.]

- 13. Turbidity (Nephelometric Turbidity Unit-NTU)**
- i. Maximum 30-day average of 15 NTU, a maximum of 50 NTU at any time. FW2, SE3**
 - ii. Maximum 30-day average of 10 NTU, a maximum of 30 NTU at any time. SE1, SE2**
 - iii. Levels shall not exceed 10.0 NTU. SC**

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(e) Surface Water Quality Criteria for Ammonia are derived in accordance with the formulas set forth below. Acute criteria are expressed as three-hour average using MA1CD10 flow and chronic criteria are expressed as 30-day average using MA30CD10 flow. No exceedance of criteria shall be permitted at or above the design flows specified.

<u>CAS Number</u>	<u>Criteria</u>	<u>Classification</u>
<u>Ammonia, un-ionized (mg NH₃-N/L)</u>	<u>(1) at pH < 8.30</u>	<u>FW2-TP, FW2-TM</u>
	<u>$0.179 * 10^{0.026(\text{Temp}-20) + 0.41 (\text{pH}-7.80)}$ (a)</u>	
	<u>$0.046 * 10^{0.026(\text{Temp}-20) + 0.41 (\text{pH}-7.80)}$ (c)</u>	
	<u>at pH ≥ 8.30</u>	
	<u>$0.179 * 10^{0.026(\text{Temp}-20) + 0.20}$ (a)</u>	
	<u>$0.046 * 10^{0.026(\text{Temp}-20) + 0.20}$ (c)</u>	
	<u>(2) at pH < 8.30</u>	<u>FW2-NT</u>
	<u>$0.201 * 10^{0.026(\text{Temp}-20) + 0.41 (\text{pH}-7.80)}$ (a) (Summer¹)</u>	
	<u>$0.054 * 10^{0.026(\text{Temp}-20) + 0.41 (\text{pH}-7.80)}$ (c) (Summer¹)</u>	
	<u>$0.232 * 10^{0.026(\text{Temp}-20) + 0.41 (\text{pH}-7.80)}$ (a) (Winter²)</u>	
	<u>$0.060 * 10^{0.026(\text{Temp}-20) + 0.41 (\text{pH}-7.80)}$ (c) (Winter²)</u>	
	<u>at pH ≥ 8.30</u>	
	<u>$0.201 * 10^{0.026(\text{Temp}-20) + 0.20}$ (a) (Summer¹)</u>	
	<u>$0.054 * 10^{0.026(\text{Temp}-20) + 0.20}$ (c) (Summer¹)</u>	
	<u>$0.232 * 10^{0.026(\text{Temp}-20) + 0.20}$ (a) (Winter²)</u>	
<u>$0.060 * 10^{0.026(\text{Temp}-20) + 0.20}$ (c) (Winter²)</u>		
<u>(3) at pH < 8.30</u>	<u>PL</u>	
<u>$0.238 * 10^{0.026(\text{Temp}-20) + 0.41 (\text{pH}-7.80)}$ (a)</u>		
	<u>$0.061 * 10^{0.026(\text{Temp}-20) + 0.41 (\text{pH}-7.80)}$ (c)</u>	
<u>(4) 0.115(a); 0.030(c)</u>	<u>All SE</u>	
<u>(5) 0.094(a); 0.024(c)</u>		
	<u>SC</u>	

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-
- 1 Summer spawning period from March 1st through October 31st.
 - 2 Winter non-spawning period from November 1st through February 28/29th.
 - (a) Acute aquatic life protection criterion
 - (c) Chronic aquatic life protection criterion
-

(f) Surface Water Quality Criteria for Toxic Substances are as follows:

- 1. Acute aquatic life protection criteria are determined with no exceedance at or above the MA1CD10 flow and expressed as one-hour average except,**
 - i. for copper the criteria are expressed as 24-hour average, and**
 - ii. for cadmium, chromium, lead, mercury, nickel, silver, and zinc the criteria are expressed as 6-hour average.**

- 2. Chronic aquatic life protection criteria are determined with no exceedance at or above the MA7CD10 flow and expressed as four-day average.**

- 3. Freshwater aquatic criteria for cadmium, chromium III, copper, nickel, silver, and zinc are expressed as a function of water hardness. Criteria can be calculated at any hardness using these equations as listed below. Criteria thus calculated are multiplied by appropriate conversion factor (CF) to convert total recoverable metal into dissolved metal and by the default Water Effect Ratio (WER) of 1.0.**

$$\text{General formula } \underline{WER [e^{(V[\ln(\text{hardness})] + \ln A - V[\ln Z])}] CF}$$

where:

V = pooled slope

A = FAV at given hardness

Z = selected value of hardness

Cadmium:

Acute dissolved criterion $WER [e^{(1.0166 (\ln [\text{hardness}]) - 3.924)}] 0.651$

Chronic dissolved criterion $WER [e^{(0.7409 (\ln [\text{hardness}]) - 4.719)}] 0.651$

Chromium III:

Acute dissolved criterion $WER [e^{(0.819 (\ln [\text{hardness}]) + 3.7256)}] 0.277$

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Chronic dissolved criterion $WER [e^{(0.819 (\ln [\text{hardness}]) + 0.6848)}] 0.277$

Copper:

Acute dissolved criterion $WER [e^{(0.9422 (\ln [\text{hardness}]) - 1.7)}] 0.908$

Chronic dissolved criterion $WER [e^{(0.8545 (\ln [\text{hardness}]) - 1.702)}] 0.908$

Nickel:

Acute dissolved criterion $WER [e^{(0.846 (\ln [\text{hardness}]) + 2.255)}] 0.846$

Chronic dissolved criterion $WER [e^{(0.846 (\ln [\text{hardness}]) + 0.0584)}] 0.846$

Silver:

Acute dissolved criterion $WER [e^{(1.72 (\ln [\text{hardness}]) - 6.59)}] 0.85$

Zinc:

Acute or dissolved criterion $WER [e^{(0.8473 (\ln [\text{hardness}]) + 0.884)}] 0.950$

Chronic dissolved criterion $WER [e^{(0.8473 (\ln [\text{hardness}]) + 0.884)}] 0.950$

4. Freshwater criteria for pentachlorophenol are expressed as a function of pH. Criteria are derived in accordance with the formula set forth below:

Acute criterion = $e^{(1.005[\text{pH}] - 4.869)}$

Chronic criterion = $e^{(1.005[\text{pH}] - 5.134)}$

5. Human health noncarcinogenic effect-based criteria are expressed as a 30-day average with no frequency of exceedance at or above the MA7CD10 flow.

6. Human health carcinogenic effect-based criteria are based on a risk level of one-in-one-million and are expressed as a 70-year average with no frequency of exceedance at or above the MA7CD10 flow except for those listed at N.J.A.C. 7:9B-1.5(c)2iii.

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7. SURFACE WATER QUALITY CRITERIA FOR TOXIC SUBSTANCES:
($\mu\text{g/L}$)

Toxic Substance	CAS Number	Fresh Water (FW2) Criteria			Saline Water (SE & SC) Criteria		
		Aquatic		Human Health	Aquatic		Human Health
		Acute	Chronic		Acute	Chronic	
<u>Acenaphthene</u>	<u>83-32-9</u>			<u>670(h)</u>			<u>990(h)</u>
<u>Acrolein</u>	<u>107-02-8</u>			<u>6.1(h)</u>			<u>9.3(h)</u>
<u>Acrylonitrile</u>	<u>107-13-1</u>			<u>0.051(hc)</u>			<u>0.25(hc)</u>
<u>Aldrin</u>	<u>309-00-2</u>	<u>3.0</u>		<u>0.000049(hc)</u>	<u>1.3</u>		<u>0.000050(hc)</u>
<u>Ammonia, un-ionized</u>	<u>7664-41-7</u>	<u>See N.J.A.C. 7:9B-1.14(e)</u>			<u>See N.J.A.C. 7:9B-1.14(e)</u>		
<u>Anthracene</u>	<u>120-12-7</u>			<u>8,300(h)</u>			<u>40,000(h)</u>
<u>Antimony</u>	<u>7440-36-0</u>			<u>5.6(h)(T)</u>			<u>640(h)(T)</u>
<u>Arsenic</u>	<u>7440-38-2</u>	<u>340(d)(s)</u>	<u>150(d)(s)</u>	<u>0.017(hc)(T)</u>	<u>69(d)(s)</u>	<u>36(d)(s)</u>	<u>0.061(hc)(T)</u>
<u>Asbestos</u>	<u>1332-21-4</u>			<u>7x10⁶fibers/L >10μm(h)</u>			
<u>Barium</u>	<u>7440-39-3</u>			<u>2,000(h)(T)</u>			
<u>Benz(a)anthracene</u>	<u>56-55-3</u>			<u>0.038(hc)</u>			<u>0.18(hc)</u>
<u>Benzene</u>	<u>71-43-2</u>			<u>0.15(hc)</u>			<u>3.3(hc)</u>
<u>Benzidine</u>	<u>92-87-5</u>			<u>0.000086(hc)</u>			<u>0.00020(hc)</u>
<u>3,4-Benzofluoranthene (Benzo(b)fluoranthene)</u>	<u>205-99-2</u>			<u>0.038(hc)</u>			<u>0.18(hc)</u>
<u>Benzo(k)fluoranthene</u>	<u>207-08-9</u>			<u>0.38(hc)</u>			<u>1.8(hc)</u>
<u>Benzo(a)pyrene (BaP)</u>	<u>50-32-8</u>			<u>0.0038(hc)</u>			<u>0.018(hc)</u>
<u>Beryllium</u>	<u>7440-41-7</u>			<u>6.0(h)(T)</u>			<u>42(h)(T)</u>
<u>alpha-BHC (alpha-HCH)</u>	<u>319-84-6</u>			<u>0.0026(hc)</u>			<u>0.0049(hc)</u>
<u>beta-BHC (beta-HCH)</u>	<u>319-85-7</u>			<u>0.0091(hc)</u>			<u>0.017(hc)</u>
<u>gamma-BHC (gamma-HCH/Lindane)</u>	<u>58-89-9</u>	<u>0.95</u>		<u>0.98(h)</u>	<u>0.16</u>		<u>1.8(h)</u>
<u>Bis(2-chloroethyl) ether</u>	<u>111-44-4</u>			<u>0.030(hc)</u>			<u>0.53(hc)</u>
<u>Bis(2-chloroisopropyl) ether</u>	<u>108-60-1</u>			<u>1,400(h)</u>			<u>65,000(h)</u>
<u>Bis(2-ethylhexyl) phthalate</u>	<u>117-81-7</u>			<u>1.2(hc)</u>			<u>2.2(hc)</u>
<u>Bromodichloromethane (Dichlorobromomethane)</u>	<u>75-27-4</u>			<u>0.55(hc)</u>			<u>17(hc)</u>
<u>Bromoform</u>	<u>75-25-2</u>			<u>4.3(hc)</u>			<u>140(hc)</u>
<u>Butyl benzyl phthalate</u>	<u>85-68-7</u>			<u>150(h)</u>			<u>190(h)</u>
<u>Cadmium</u>	<u>7440-43-9</u>	<u>(a)</u>	<u>(a)</u>	<u>3.4(h)(T)</u>	<u>40(d)(s)</u>	<u>8.8(d)(s)</u>	<u>16(h)(T)</u>
<u>Carbon tetrachloride</u>	<u>56-23-5</u>			<u>0.33(hc)</u>			<u>2.3(hc)</u>

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<u>Chlordane</u>	<u>57-74-9</u>	<u>2.4</u>	<u>0.0043</u>	<u>0.00010(hc)</u>	<u>0.09</u>	<u>0.0040</u>	<u>0.00011(hc)</u>
<u>Chloride</u>	<u>16887-00-6</u>	<u>860,000</u>	<u>230,000</u>	<u>250,000(ol)</u>			
<u>Chlorine Produced Oxidants (CPO)</u>	<u>7782-50-5</u>	<u>19</u>	<u>11</u>		<u>13</u>	<u>7.5</u>	
<u>Chlorobenzene</u>	<u>108-90-7</u>			<u>210(h)</u>			<u>2,500(h)</u>
<u>Chloroform</u>	<u>67-66-3</u>			<u>68(h)</u>			<u>2,100(h)</u>
<u>2-Chloronaphthalene</u>	<u>91-58-7</u>			<u>1,000(h)</u>			<u>1,600(h)</u>
<u>2-Chlorophenol</u>	<u>95-57-8</u>			<u>81(h)</u>			<u>150(h)</u>
<u>Chlorpyrifos</u>	<u>2921-88-2</u>	<u>0.083</u>	<u>0.041</u>		<u>0.011</u>	<u>0.0056</u>	
<u>Chromium</u>	<u>7440-47-3</u>			<u>92(h)(T)</u>			<u>750(h)(T)</u>
<u>Chromium⁺³</u>	<u>16065-83-1</u>	<u>(a)</u>	<u>(a)</u>				
<u>Chromium⁺⁶</u>	<u>18540-29-9</u>	<u>15(d)(s)</u>	<u>10(d)(s)</u>		<u>1,100(d)(s)</u>	<u>50(d)(s)</u>	
<u>Chrysene</u>	<u>218-01-9</u>			<u>3.8(hc)</u>			<u>18(hc)</u>
<u>Copper</u>	<u>7440-50-8</u>	<u>(a)</u>	<u>(a)</u>	<u>1,300(h)(T)</u>	<u>4.8(d)(s)</u>	<u>3.1(d)(s)</u>	
<u>Cyanide (Total)</u>	<u>57-12-5</u>	<u>22(fc)</u>	<u>5.2(fc)</u>	<u>140(h)</u>	<u>1.0(fc)</u>	<u>1.0(fc)</u>	<u>140(h)</u>
<u>4,4'-DDD (p,p'-TDE)</u>	<u>72-54-8</u>			<u>0.00031(hc)</u>			<u>0.00031(hc)</u>
<u>4,4'-DDE</u>	<u>72-55-9</u>			<u>0.00022(hc)</u>			<u>0.00022(hc)</u>
<u>4,4'-DDT</u>	<u>50-29-3</u>	<u>1.1</u>	<u>0.0010</u>	<u>0.00022(hc)</u>	<u>0.13</u>	<u>0.0010</u>	<u>0.00022(hc)</u>
<u>Demeton</u>	<u>8065-48-3</u>		<u>0.1</u>			<u>0.1</u>	
<u>Dibenz(a,h)anthracene</u>	<u>53-70-3</u>			<u>0.0038(hc)</u>			<u>0.018(hc)</u>
<u>Dibromochloromethane (Chlorodibromomethane)</u>	<u>124-48-1</u>			<u>0.40(hc)</u>			<u>13(hc)</u>
<u>Di-n-butyl phthalate</u>	<u>84-74-2</u>			<u>2,000(h)</u>			<u>4,500(h)</u>
<u>1,2-Dichlorobenzene</u>	<u>95-50-1</u>			<u>2,000(h)</u>			<u>6,200(h)</u>
<u>1,3-Dichlorobenzene</u>	<u>541-73-1</u>			<u>2,200(h)</u>			<u>8,300(h)</u>
<u>1,4-Dichlorobenzene</u>	<u>106-46-7</u>			<u>550(h)</u>			<u>2,200(h)</u>
<u>3,3'-Dichlorobenzidine</u>	<u>91-94-1</u>			<u>0.021(hc)</u>			<u>0.028(hc)</u>
<u>1,2-Dichloroethane</u>	<u>107-06-2</u>			<u>0.29(hc)</u>			<u>28(hc)</u>
<u>1,1-Dichloroethylene</u>	<u>75-35-4</u>			<u>4.7(h)</u>			<u>100(h)</u>
<u>trans-1,2-Dichloroethylene</u>	<u>156-60-5</u>			<u>590(h)</u>			<u>43,000(h)</u>
<u>2,4-Dichlorophenol</u>	<u>120-83-2</u>			<u>77(h)</u>			<u>290(h)</u>
<u>1,2-Dichloropropane</u>	<u>78-87-5</u>			<u>0.50(hc)</u>			<u>15(hc)</u>
<u>1,3-Dichloropropene (cis and trans)</u>	<u>542-75-6</u>			<u>0.34(hc)</u>			<u>21(hc)</u>
<u>Dieldrin</u>	<u>60-57-1</u>	<u>0.24</u>	<u>0.056</u>	<u>0.000052(hc)</u>	<u>0.71</u>	<u>0.0019</u>	<u>0.000054(hc)</u>
<u>Diethyl phthalate</u>	<u>84-66-2</u>			<u>17,000(h)</u>			<u>44,000(h)</u>

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<u>2,4-Dimethyl phenol</u>	<u>105-67-9</u>			<u>380(h)</u>			<u>850(h)</u>
<u>4,6-Dinitro-o-cresol</u>	<u>534-52-1</u>			<u>13(h)</u>			<u>280(h)</u>
<u>2,4-Dinitrophenol</u>	<u>51-28-5</u>			<u>69(h)</u>			<u>5,300(h)</u>
<u>2,4-Dinitrotoluene</u>	<u>121-14-2</u>			<u>0.11(hc)</u>			<u>3.4(hc)</u>
<u>1,2-Diphenylhydrazine</u>	<u>122-66-7</u>			<u>0.036(hc)</u>			<u>0.20(hc)</u>
<u>Endosulfans (alpha and beta)</u>	<u>115-29-7</u>	<u>0.22</u>	<u>0.056</u>	<u>62(h)</u>	<u>0.034</u>	<u>0.0087</u>	<u>89(h)</u>
<u>Endosulfan sulfate</u>	<u>1031-07-8</u>			<u>62(h)</u>			<u>89(h)</u>
<u>Endrin</u>	<u>72-20-8</u>	<u>0.086</u>	<u>0.036</u>	<u>0.059(h)</u>	<u>0.037</u>	<u>0.0023</u>	<u>0.060(h)</u>
<u>Endrin aldehyde</u>	<u>7421-93-4</u>			<u>0.059(h)</u>			<u>0.060(h)</u>
<u>Ethylbenzene</u>	<u>100-41-4</u>			<u>530(h)</u>			<u>2,100(h)</u>
<u>Fluoranthene</u>	<u>206-44-0</u>			<u>130(h)</u>			<u>140(h)</u>
<u>Fluorene</u>	<u>86-73-7</u>			<u>1,100(h)</u>			<u>5,300(h)</u>
<u>Guthion</u>	<u>86-50-0</u>		<u>0.01</u>			<u>0.01</u>	
<u>Heptachlor</u>	<u>76-44-8</u>	<u>0.52</u>	<u>0.0038</u>	<u>0.000079(hc)</u>	<u>0.053</u>	<u>0.0036</u>	<u>0.000079(hc)</u>
<u>Heptachlor epoxide</u>	<u>1024-57-3</u>	<u>0.52</u>	<u>0.0038</u>	<u>0.000039(hc)</u>	<u>0.053</u>	<u>0.0036</u>	<u>0.000039(hc)</u>
<u>Hexachlorobenzene</u>	<u>118-74-1</u>			<u>0.00028(hc)</u>			<u>0.00029(hc)</u>
<u>Hexachlorobutadiene</u>	<u>87-68-3</u>			<u>0.44(hc)</u>			<u>18(hc)</u>
<u>Hexachlorocyclopentadiene</u>	<u>77-47-4</u>			<u>40(h)</u>			<u>1,100(h)</u>
<u>Hexachloroethane</u>	<u>67-72-1</u>			<u>1.4(hc)</u>			<u>3.3(hc)</u>
<u>Indeno(1,2,3-cd)pyrene</u>	<u>193-39-5</u>			<u>0.038(hc)</u>			<u>0.18(hc)</u>
<u>Isophorone</u>	<u>78-59-1</u>			<u>35(hc)</u>			<u>960(hc)</u>
<u>Lead</u>	<u>7439-92-1</u>	<u>38(d)(s)</u>	<u>5.4(d)(s)</u>	<u>5.0(h)(T)</u>	<u>210(d)(s)</u>	<u>24(d)(s)</u>	
<u>Malathion</u>	<u>121-75-5</u>		<u>0.1</u>			<u>0.1</u>	
<u>Manganese</u>	<u>7439-96-5</u>						<u>100(h)(T)</u>
<u>Mercury</u>	<u>7439-97-6</u>	<u>1.4(d)(s)</u>	<u>0.77(d)(s)</u>	<u>0.050(h)(T)</u>	<u>1.8(d)(s)</u>	<u>0.94(d)(s)</u>	<u>0.051(h)(T)</u>
<u>Methoxychlor</u>	<u>72-43-5</u>		<u>0.03</u>	<u>40(h)</u>		<u>0.03</u>	
<u>Methyl bromide (bromomethane)</u>	<u>74-83-9</u>			<u>47(h)</u>			<u>1,500(h)</u>
<u>Methyl t-butyl ether (MTBE)</u>	<u>1634-04-4</u>			<u>70(h)</u>			
<u>Methylene chloride</u>	<u>75-09-2</u>			<u>2.5(hc)</u>			<u>310(hc)</u>
<u>Mirex</u>	<u>2385-85-5</u>		<u>0.001</u>			<u>0.001</u>	
<u>Nickel</u>	<u>7440-02-0</u>	<u>(a)</u>	<u>(a)</u>	<u>500(h)(T)</u>	<u>64(d)(s)</u>	<u>22(d)(s)</u>	<u>1,700(h)(T)</u>
<u>Nitrate (as N)</u>	<u>14797-55-8</u>			<u>10,000(h)</u>			

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<u>Nitrobenzene</u>	<u>98-95-3</u>			<u>17(h)</u>			<u>690(h)</u>
<u>N-Nitrosodi-n-butylamine</u>	<u>924-16-3</u>			<u>0.0063(hc)</u>			<u>0.22(hc)</u>
<u>N-Nitrosodiethylamine</u>	<u>55-18-5</u>			<u>0.00023(hc)</u>			<u>0.13(hc)</u>
<u>N-Nitrosodimethylamine</u>	<u>62-75-9</u>			<u>0.00069(hc)</u>			<u>3.0(hc)</u>
<u>N-Nitrosodiphenylamine</u>	<u>86-30-6</u>			<u>3.3(hc)</u>			<u>6.0(hc)</u>
<u>N-Nitrosodi-n-propylamine</u> <u>(Di-n-propylnitrosamine)</u>	<u>621-64-7</u>			<u>0.0050(hc)</u>			<u>0.51(hc)</u>
<u>N-Nitrosopyrrolidine</u>	<u>930-55-2</u>			<u>0.016(hc)</u>			<u>34(hc)</u>
<u>Parathion</u>	<u>56-38-2</u>	<u>0.065</u>	<u>0.013</u>				
<u>Pentachlorobenzene</u>	<u>608-93-5</u>			<u>1.4(h)</u>			<u>1.5(h)</u>
<u>Pentachlorophenol</u>	<u>87-86-5</u>	<u>(b)</u>	<u>(b)</u>	<u>0.27(hc)</u>	<u>13</u>	<u>7.9</u>	<u>3.0(hc)</u>
<u>Phenol</u>	<u>108-95-2</u>			<u>10,000(h)</u>			<u>860,000(h)</u>
<u>Phosphorous (yellow)</u>	<u>7723-14-0</u>					<u>0.1</u>	
<u>Polychlorinated biphenyls</u> <u>(PCBs)</u>	<u>1336-36-3</u>		<u>0.014</u>	<u>0.000064(hc)</u>		<u>0.030</u>	<u>0.000064(hc)</u>
<u>Pyrene</u>	<u>129-00-0</u>			<u>830(h)</u>			<u>4,000(h)</u>
<u>Selenium</u>	<u>7782-49-2</u>	<u>20(s)</u>	<u>5.0(s)</u>	<u>170(h)(T)</u>	<u>290(d)(s)</u>	<u>71(d)(s)</u>	<u>4,200(h)(T)</u>
<u>Silver</u>	<u>7440-22-4</u>	<u>(a)</u>		<u>170(h)(T)</u>	<u>1.9(d)(s)</u>		<u>40,000(h)(T)</u>
<u>Sulfide-hydrogen sulfide</u> <u>(undissociated)</u>	<u>7783-06-4</u>		<u>2</u>			<u>2</u>	
<u>1,2,4,5-Tetrachlorobenzene</u>	<u>95-94-3</u>			<u>0.97(h)</u>			<u>1.1(h)</u>
<u>2,3,7,8-Tetrachlorodibenzo</u> <u>-p-dioxin (TCDD)</u>	<u>1746-01-6</u>			<u>0.0000000050(hc)</u>			<u>0.0000000051(hc)</u>
<u>1,1,2,2-Tetrachloroethane</u>	<u>79-34-5</u>			<u>4.7(h)</u>			<u>110(h)</u>
<u>Tetrachloroethylene</u>	<u>127-18-4</u>			<u>0.34(hc)</u>			<u>1.6(hc)</u>
<u>Thallium</u>	<u>7440-28-0</u>			<u>0.24(h)(T)</u>			<u>0.47(h)(T)</u>
<u>Toluene</u>	<u>108-88-3</u>			<u>1,300(h)</u>			<u>15,000(h)</u>
<u>Toxaphene</u>	<u>8001-35-2</u>	<u>0.73</u>	<u>0.0002</u>	<u>0.00028(hc)</u>	<u>0.21</u>	<u>0.0002</u>	<u>0.00028(hc)</u>
<u>1,2,4-Trichlorobenzene</u>	<u>120-82-1</u>			<u>21(h)</u>			<u>42(h)</u>
<u>1,1,1-Trichloroethane</u>	<u>71-55-6</u>			<u>120(h)</u>			<u>2,600(h)</u>
<u>1,1,2-Trichloroethane</u>	<u>79-00-5</u>			<u>13(h)</u>			<u>350(h)</u>
<u>Trichloroethylene</u>	<u>79-01-6</u>			<u>1.0(hc)</u>			<u>12(hc)</u>
<u>2,4,5-Trichlorophenol</u>	<u>95-95-4</u>			<u>1,800(h)</u>			<u>3,600(h)</u>
<u>2,4,6-Trichlorophenol</u>	<u>88-06-2</u>			<u>0.58(hc)</u>			<u>1.0(hc)</u>
<u>Vinyl chloride</u>	<u>75-01-4</u>			<u>0.082(hc)</u>			<u>8.1(hc)</u>
<u>Zinc</u>	<u>7440-66-6</u>	<u>(a)</u>	<u>(a)</u>	<u>7,400(h)(T)</u>	<u>90(d)(s)</u>	<u>81(d)(s)</u>	<u>26,000(h)(T)</u>

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- (a) Criteria as listed at (f)3 above as formula
- (b) Criteria as listed at (f)4 above as formula
- (d) Criterion is expressed as a function of the Water Effect Ratio (WER). For criterion in the table, WER equates to the default value of 1.0.
- (fc) Criteria expressed as free cyanide (as CN)/L
- (h) Human health noncarcinogen
- (hc) Human health carcinogen
- (ol) Organoleptic effect-based criterion with no frequency of exceedance at or above the MA7CD10 flow
- (s) Dissolved criterion
- (T) Total recoverable criterion

(g) Site-specific surface water quality criteria listed below apply to specific waterbodies that supersede the State-wide criteria listed at (d) through (f) above.

<u>Toxic Substance</u>	<u>CAS Number</u>	<u>Freshwater Criteria</u>			<u>Saline water Criteria</u>			<u>Waterbodies</u>
		<u>Aquatic</u>		<u>Human Health</u>	<u>Aquatic</u>		<u>Human Health</u>	
		<u>Acute</u>	<u>Chronic</u>		<u>Acute</u>	<u>Chronic</u>		
<u>Copper (µg/L dissolved)</u>	<u>7440508</u>				<u>7.9</u>	<u>5.6</u>		<u>Newark Bay, Raritan Bay, Arthur Kill, Kill Van Kull, saline portions of the Passaic, Hackensack, and Hudson Rivers and saline portions of tributaries to all of these waters.</u>

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[(d)] **(h)** (No Change in Text.)

7:9B-1.15 Surface water classifications for the waters of the State of New Jersey

(a) (No Change.)

(b) The following are instructions for the use of Tables 1 through 5 found in N.J.A.C. 7:9B-1.15(c) through (g) respectively:

1. The surface water classification tables give the surface water classifications for waters of the State. Surface waters of the State and their classifications are listed in the table covering the major drainage basin in which they are located. The major drainage basins are:

i. - ii. (No Change.)

iii. The Passaic River, [Hudson] **Hackensack** River and New York Harbor Complex drainage basin which contains the surface waters listed in Table 3 in (e) below;

iv. - v. (No Change.)

2. - 7. (No Change.)

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(c) The surface water classifications in Table 1 are for waters of the Atlantic Coastal Basin:

TABLE 1

Waterbody	Classification
...	
BARNEGAT BAY	
(Barnegat National Wildlife Refuge) - All waters within the boundaries of the Barnegat National Wildlife Refuge	SE1(C1)
(Barnegat Light) - All other waters of the Bay	SE1(C1)
(Island Beach State Park) - All freshwater ponds within the boundaries of Island Beach State Park	FW1
(Island Beach State Park) - All waters in the Park, not classified as FW1 above	FW2-NT/SE1[/SC](C1)
...	
BRIGANTINE ([Brigantine] <u>Edwin B. Forsythe</u> National Wildlife Refuge) - All waters within the boundaries of the [Brigantine] <u>Edwin B. Forsythe</u> National Wildlife Refuge	FW2-NT/SE1(C1)
...	
GREAT BAY (Brigantine) - All waters of the Bay and all natural waterways which are tributary to the Bay and all waters, including both natural and manmade channels and ponds within the boundaries of the [Brigantine] <u>Edwin B. Forsythe</u> National Wildlife Refuge and the Great Bay Wildlife Management Area	FW2-NT/SE1(C1)
...	

(d) The surface water classifications in Table 2 are for waters of the Delaware River Basin:

TABLE 2

Waterbody	Classification
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...

JADE RUN ([Lebanon] **Brendan T. Byrne** State Forest) - **Entire length** FW1

...

MOUNT MISERY BROOK

(Woodmansie) - Entire length, except segments described below PL

SOUTH BRANCH, MOUNT MISERY BROOK

([Lebanon] **Brendan T. Byrne** State Forest) - All tributaries to the South Branch that are located entirely within the boundaries of [Lebanon] **Brendan T. Byrne** State Forest FW1

(Pasadena) - The two easterly branches of the Branch which are located entirely within the boundaries of the Pasadena Wildlife Management Area FW1

...

PAULINS KILL

EAST BRANCH (No Change.)

WEST BRANCH (Newton) (No Change.)

MAIN STEM (No Change.)

TRIBUTARIES, MAIN STEM

(Blairstown) - Entire length of tributary east of Walnut Valley FW2-TM

(E. of Hainesburg Station) - Entire length **FW2-TM**

(E. of Vail) - Source downstream to confluence with outlet stream of Lake Susquehanna **FW2-TM**

(Emmons Station) - Entire length FW2-TP(C1)

(Stillwater) - Entire length FW2-TM

(Stillwater Station) - Entire length FW2-TP(C1)

...

RANCOCAS CREEK

NORTH BRANCH (No Change.)

SOUTH BRANCH RANCOCAS CREEK (No Change.)

COOPER BRANCH RANCOCAS CREEK

(Woodmansie) - Entire length, except portions described separately, below PL

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<p>([Lebanon] <u>Brendan T. Byrne</u> State Forest) - Branch and tributaries downstream to Pakim Pond, and tributaries to Cooper Branch located entirely within the [Lebanon] <u>Brendan T. Byrne</u> State Forest boundaries</p> <p>DEER PARK BRANCH RANCOCAS CREEK</p> <p>MACDONALDS BRANCH RANCOCAS CREEK (Woodmansie) - Entire length, except as described separately below</p> <p>([Lebanon] <u>Brendan T. Byrne</u> State Forest) - Branch and tributaries located entirely within [Lebanon] <u>Brendan T. Byrne</u> State Forest</p> <p>SHINNS BRANCH RANCOCAS CREEK ([Lebanon] <u>Brendan T. Byrne</u> State Forest) - Branch and tributaries located entirely within the boundaries of [Lebanon] <u>Brendan T. Byrne</u> State Forest, from their sources to the forest boundary</p> <p>(Lebanon Lake Estates) - Forest boundary to lake</p> <p>...</p>	<p>FW1 (No Change.)</p> <p>PL</p> <p>FW1</p> <p>FW1 PL</p>
--	--

(e) The surface water classifications in Table 3 are for waters of the Passaic, Hackensack and New York Harbor Complex Basin:

TABLE 3

Waterbody	Classification
...	
<p>BEECH BROOK (West Milford) - From State line downstream to Monksville Reservoir, <u>including all tributaries</u></p>	<p>[FW2-TM] <u>FW2-TP(C1)</u></p>
...	
<p>KIKEOUT BROOK (Butler) - [Entire length] <u>See STONE HOUSE BROOK</u></p>	<p>[FW2-NT]</p>
...	
SADDLE RIVER	

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(Upper Saddle River) - State line to Bergen County Rt. 2 <u>(Lake Street) bridge</u>	FW2-TP(C1)
<u>(Upper Saddle River) - Bergen County Rt. 2 (Lake Street) bridge downstream to confluence with Pleasant Brook, including all tributaries</u>	<u>FW2-TP(C1)</u>
(Saddle River) - [Bergen County Rt. 2 bridge] <u>Pleasant Brook</u> to Allendale Rd. bridge	FW2-TM
(Lodi) - Allendale Rd. bridge to Passaic River	FW2-NT/SE3
...	
STONE HOUSE BROOK [(Kinnelon) - Entire length <u>(Kinnelon) - Source to Valley Road bridge</u> <u>(Butler) - Valley Road bridge to confluence with Pequannock River</u>	FW2-NT] <u>FW2-NT</u> <u>FW2-TP(C1)</u>
...	
WANAQUE RIVER MAIN STEM	
(Wanaque) - Greenwood Lake outlet, through Wanaque Wildlife Management Area and Long Pond Iron Works State Park, including the Monksville Reservoir, to the Monksville Reservoir dam at Stonetown Road, except tributary <u>south of Jennings Creek (Hewitt)</u> described separately below	FW2-TM(C1)
[(Hewitt) - Entire length of tributary south of Jennings Creek	FW2-TP(C1)]
(Pompton Lakes) - Wanaque Reservoir dam to Wanaque Ave. bridge <u>including unnamed tributaries</u>	[FW2-NT] <u>FW2-TP(C1)</u>
(Pompton Lakes) - Wanaque Ave. bridge downstream to Pequannock River	FW2-TM
<u>TRIBUTARY</u> <u>(Hewitt) - Entire length of tributary south of Jennings Creek</u>	<u>FW2-TP(C1)</u>
...	

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(f) The surface water classifications in Table 4 are for waters of the Raritan River and Raritan Bay Basin:

TABLE 4

Waterbody	Classification
...	
TOWN NECK CREEK	
(Little Silver) - Source to a line beginning on the easternmost extent of the unnamed point of land located just east of Paag Circle on the south bank of Town Neck Creek and bearing approximately 095 degrees True North and terminating on Silver Point	FW2-NT/SE1
(Little Silver) - Creek below <u>the</u> line described [below] <u>above</u>	SE1(C1)
...	

(g) The surface water classifications in Table 5 are for waters of the Wallkill River Basin:

TABLE 5

Waterbody	Classification
...	
<u>CEDAR SWAMP - See RUTGERS CREEK</u>	
...	
FRANKLIN POND CREEK	
(Hardyston) - Source to, but not including, Franklin Pond	FW2-TP(C1)
(Hamburg Mtn.) - Tributaries within the Hamburg Mtn. Wildlife Management Area	FW2-TM(C1)
TRIBUTARY (Hamburg Mtn.) - The first tributary to Franklin Pond Creek just south of Hamburg Mountain, flowing toward the Wallkill River and located entirely within the former Hamburg Mtn. Wildlife Management Area	FW1(<u>tm</u>)

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LONG HOUSE BROOK

(Upper Greenwood Lake) - Source to State line, except segment described below	FW2-NT
(Upper Greenwood Lake) - Segment within the [bounds] <u>boundaries</u> of Hewitt State Forest	FW2-NT(C1)

...

WALLKILL RIVER

(Sparta) - Source to confluence with Sparta Glen Brook	FW2-NT
(Franklin) - Sparta Glen Brook to, but not including, Franklin Pond	FW2-TM
(Wantage) - Outlet of Franklin Pond to State line	FW2-NT

TRIBUTARIES

(Sparta) - Lake Saginaw dam downstream to Wallkill River	FW2-TP(C1)
[(Hamburg Mtn.) - The first tributary, just south of Hamburg Mtn., flowing toward the Wallkill River and located entirely within the Hamburg Mtn. Wildlife Management Area	FW1(tm)]
(Ogdensburg) - Tributary from the outlet of Heaters Pond to the confluence with the Wallkill River	FW2-TP(C1)

...

(h) FW1 waters are listed in Table 6 by tract within basins:

Table 6

ATLANTIC COASTAL PLAIN BASIN	(No Change.)
DELAWARE RIVER BASIN	
ALLAMUCHY STATE PARK	(No Change.)
BELLEPLAIN STATE FOREST	(No Change.)
COLLIERS MILLS WILDLIFE MANAGEMENT AREA	(No Change.)
DELAWARE WATER GAP NATIONAL RECREATION AREA	(No Change.)
DIX WILDLIFE MANAGEMENT AREA	(No Change.)

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EDWARD G. BEVAN WILDLIFE (No Change.)

MANAGEMENT AREA

FLATBROOK-ROY WILDLIFE (No Change.)

MANAGEMENT AREA

GLASSBORO WILDLIFE (No Change.)

MANAGEMENT AREA

HIGH POINT STATE PARK (No Change.)

AND STOKES STATE FOREST

JOHNSONBURG NATURAL (No Change.)

AREA

[LEBANON] **BRENDAN T. BYRNE**RANCOCAS CREEK WATERSHED

STATE FOREST

Deer Park Branch and tributaries near Buckingham, downstream to the confluence with Pole Bridge Branch

Tributaries to the South Branch of Mount Misery Brook located entirely within the boundaries of [Lebanon] **Brendan T. Byrne** State Forest

Cooper Branch and tributaries downstream to Pakim Pond and those tributaries to Coopers Branch downstream of Pakim Pond that are located entirely within the boundaries of [Lebanon] **Brendan T. Byrne** State Forest

Shinns Branch and tributaries located entirely within the boundaries of [Lebanon] **Brendan T. Byrne** State Forest, from their sources to the forest boundary

Jade Run located entirely within the boundaries of [Lebanon] **Brendan T. Byrne** State Forest

MacDonalds Branch and tributaries located entirely within the boundaries of [Lebanon] **Brendan T. Byrne** State Forest, from their sources to the forest boundary

MILLVILLE FISH AND GAME (No Change.)

TRACT

PASADENA WILDLIFE (No Change.)

MANAGEMENT AREA

PEASELEE WILDLIFE (No Change.)

MANAGEMENT AREA

WASHINGTON CROSSING (No Change.)

STATE PARK

WHITTINGHAM WILDLIFE (No Change.)

MANAGEMENT AREA

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WORTHINGTON STATE FOREST (No Change.)

PASSAIC RIVER, HACKENSACK RIVER,

NY HARBOR COMPLEX BASIN (No Change.)

RARITAN RIVER BASIN (No Change.)

WALKKILL RIVER BASIN (No Change.)

(i) (No Change.)

Based on consultation with staff, I hereby certify that the above statements, including the Federal standards analysis addressing the requirements of Executive Order 27 (1994), permit the public to understand accurately and plainly the purposes and expected consequences of this proposed readoption with amendments. I hereby authorize this proposal.

Date: _____

Bradley M. Campbell, Commissioner
Department of Environmental Protection