UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region 1
5 Post Office Square, Suite 100
Boston, MA 02109-3912

June 23, 2020

Mr. Gerald D. Reid, Commissioner
State of Maine – Department of Environmental Protection
17 State House Station
Augusta, Maine 04333-0017

Re: Review and Action on Maine Water Quality Standards, 06-096 Chapter 584

Dear Mr. Reid:

By letter dated April 24, 2020, the Maine Department of Environmental Protection (DEP) submitted new and revised Water Quality Standards (WQS) in accordance with Section 303(c) of the Clean Water Act (CWA). Public notice of this rulemaking was published on October 2, 2019 and October 30, 2019. The Maine Board of Environmental Protection (BEP) held a public hearing on the proposed rulemaking on November 21, 2019. The public comment period closed on December 6, 2019. The BEP voted on, and approved, the Chapter 584 WQS revisions on February 6, 2020. They were filed with the Maine Secretary of State and became effective on February 16, 2020. On April 22, 2020 the Attorney General certified that the 06-096 Chapter 584, Surface Water Quality for Toxic Pollutants amendments were duly adopted as WQS pursuant to State law.

The new and revised provisions in Chapter 584 include human health criteria (HHC), aquatic life criteria (ALC) and site-specific criteria (SSC) for three specific river segments. This letter addresses only the HHC provisions in Chapter 584. EPA will address new and revised ALC and SSC in a separate action letter. As detailed in Attachment 1, EPA has determined that DEP's new and revised HHC provisions in Chapter 584 are consistent with the requirements of the CWA and applicable federal regulations. EPA therefore approves the new and revised HHC provisions in Chapter 584.

We look forward to continued cooperation with Maine in the development, review, and approval of water quality standards pursuant to our responsibilities under the CWA. If you have any questions, please contact Dan Arsenault (617 918-1562) or Michael Knapp (617 918-1053).

Sincerely,

KENNETH MORAFF Digitally signed by KENNETH MORAFF Date: 2020.06.23 09:54:56 -04'00'

Ken Moraff, Director
Water Division
EPA Region 1

cc:

Brian Kavanah, Director, Bureau of Water Quality, DEP
Mark Margerum, Office of the Commissioner, DEP
Scott Boak, Assistant Attorney General, Chief, Natural Resources Division

Attachment 1
Supporting Discussion of EPA's Approvals of Maine's New and Revised Human Health Criteria (HHC) for Toxic Pollutants

Revisions to Maine's HHC for toxic pollutants are set forth in DEP's regulations at 06-096 CMR Chapter 584.5.C, and in Appendix A to Ch. 584. There are two sets of HHC in Tables 1 and 2 of Appendix A (see Attachment 2). One set protects the statewide "fishing" designated use, and the other set protects the State's new "sustenance fishing" designated use subcategory that applies to specifically identified waters. The underlined criteria values in Tables 1 and 2 represent the new/revised criteria; strike-out criteria values represent deletions to this chapter.

EPA reviewed these HHC for consistency with the Clean Water Act (CWA) and federal implementing regulations at 40 CFR Part 131. EPA's 2000 Human Health Methodology provides guidance for deriving HHC for toxic pollutants.[1] For each variable used in the criteria calculation, the 2000 Methodology provides a default value that may be used by states and guidance on adjustments that may be appropriate to reflect local conditions and/or protect identifiable populations or subpopulations. Pursuant to 40 C.F.R. §131.11(a), EPA must ensure that new or revised criteria are based on sound scientific rationale and that they protect designated uses, including subcategories of uses.

A. HHC Applicable to Waters Subject to the Sustenance Fishing Designated Use Subcategory Established by 38 M.R.S. §466(10-A), and Specified Under 38 M.R.S. §§ 465-A(1)(D), 467(7)(A)(B)(D), 467(13), 467(15)(C), 467(15)(A)(E)(F), 468(8), and 469(7).

In 2019, Maine adopted, and EPA approved, 38 M.R.S. § 466(10-A), which establishes and defines a "sustenance fishing designated use" as "a subcategory of the applicable fishing designated use that protects human consumption of fish for nutritional and cultural purposes and applies only to those water body segments that are identified in this article as subject to a sustenance fishing designated use." Maine adopted the sustenance fishing designated use subcategory (SFDU) for waters "where there is or may be sustenance fishing or increased fish consumption by members of the Indian tribes in Maine or other Maine citizens."[2] These waters are specifically identified in 38 M.R.S. §§ 465-A(1)(D), 467(7)(A)(B)(D), 467(13), 467(15)(C), 467(15)(A)(E)(F), 468(8), and 469(7).

As noted above, DEP's new and revised HHC for toxic pollutants include criteria to protect the SFDU in specifically identified waters. EPA evaluated whether the HHC applicable to waters subject to the SFDU protect the sustenance fishing use.

1. HHC Other Than Arsenic

    a. Maine's Revised Criteria

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[1] USEPA. 2000. *Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health*. U.S. Environmental Protection Agency, Office of Water, Washington, D.C. EPA 822-B-00-004.

[2] *See* L.D. 1775, original text of the legislative document, summary section, at page 9-129LR2522(01)-l, May 23, 2019, available at http://legislature.maine.gov/legis/bills/bills_129th/billtexts/HP126201.asp

Chapter 584.5.C states that for waters subject to the SFDU, HHC "will be determined assuming consumption of 2.4 Liters of water, by a person weighing 80 kg, and a fish consumption rate of 200 grams per day, except for those parameters that did not change with EPA's criteria recommendations referenced in EPA 820-F-15-001 for which the human health criteria will be determined assuming consumption of 2 Liters of water by a person weighing 70 kg, a fish consumption rate of 200 grams per day, and a cancer risk level of one in 1,000,000 [$1x10^{-6}$] (except for… inorganic arsenic [discussed below]…)." The corresponding HHC values are set forth in Chapter 584, Appendix A, Tables 1 and 2.

b. Basis for EPA Approval

Maine based its HHC to protect the SFDU on a fish consumption rate (FCR),[3] body weight, drinking water intake, toxicity factors (reference dose or cancer slope factor), bioaccumulation factors, relative source contribution values, and cancer risk level for carcinogens that are at least as stringent for each pollutant as the inputs used in EPA's nationally recommended CWA Section 304(a) HHC (with the exception of arsenic, discussed below).

The purpose of these HHC is to protect human health of sustenance fishers in the identified waters. The exposure pathway for these constituents is through consumption of aquatic life and drinking water. Maine considered both toxic and carcinogenic effects when developing the HHC to protect the SFDU. The new and revised HHC reflect the latest scientific information and are consistent with EPA's most recent CWA Section 304(a) recommended HHC for each pollutant. As such, Maine's revisions are consistent with 40 C.F.R. § 131.6 (b) and (c); are based on a sound scientific rationale and protect the designated use in accordance with 40 C.F.R. § 131.11 (a) and (b)(i); and EPA hereby approves these new and revised criteria.

2. HHC for Arsenic

a. Maine's Revised Criteria

For waters subject to the SFDU, Chapter 584.5.C revisions provide that the HHC for inorganic arsenic will be based on the FCR of 200 g/day and the cancer risk level (CRL) specified by 38 M.R.S. § 420(2)(J), which is 1 in 10,000 ($1x10^{-4}$). The water consumption and body weight parameters for arsenic did not change with EPA's criteria recommendations referenced in EPA 820-F-15-001 (2015); therefore, as described above, Chapter 584.5.C requires the HHC for arsenic to be based on an assumed consumption of 2 Liters of water per day by a person weighing 70 kg.

Maine's revised HHC for inorganic arsenic applicable to the sustenance fishing waters are 1.1 μg/L for water and organism exposure and 2.6 μg/L for organism-only exposure, using a $1x10^{-4}$

[3] In a previous action, EPA approved pursuant to Section 303(c)(2) of the CWA and 40 C.F.R. Part 131, the revisions to Maine's WQS at 38 M.R.S.A. § 466-A, which mandated that Maine use a FCR of 200 g/day when developing HHC to protect the SFDU. EPA concluded that 200 g/day is a reasonable FCR, based on available information, for Maine to use to protect a contemporary sustenance level of consumption. For details on this prior action and EPA's rationale, *see* November 6, 2019 letter from Water Division Director Ken Moraff, EPA Region 1 to Commissioner Gerald Reid, Maine DEP.

CRL and a FCR of 200 g/day, a bioconcentration factor (BCF) of 26 L/kg, a cancer slope factor (CSF) of 1.75 per mg/kg/day, an inorganic fraction (IF) of 30%, a body weight (BW) of 70 kg, and drinking water rate (DW) of 2 L/day. *See* Appendix A of Chapter 584, Table I, footnote aME.[4]

b. Basis for EPA Approval

As noted above, HHC are calculated from toxicological assessment values (reference dose, cancer slope factor) and exposure factors (drinking water ingestion rate, FCR, BCF/BAF, IF (for arsenic), BW), and a CRL. States may use risk management decisions to establish values for calculating the HHC, as long as the resulting HHC are based on sound science and protective of designated uses.

EPA's national CWA Section 304(a) recommended HHC for arsenic are 0.018 µg/L and 0.14 µg/L for combined drinking water and fish/shellfish consumption exposure (i.e., water and organisms), and for consumption of organisms only, respectively (based on a BW of 70 kg, DW rate of 2 L/day, FCR of 6.5 g/day, CSF of 1.75, BCF of 44, an IF of 100%, and CRL of 10^{-6}). Maine's revised arsenic HHC are based on certain input values that differ from the inputs in EPA's national CWA Section 304(a) recommended HHC for arsenic, but the resulting HHC are nonetheless based on sound science and are protective of the designated use. EPA has determined that the resulting HHC protect the SFDU for the following reasons.

i. Approval Rationale for Maine's Organism-Only Arsenic HHC for Waters Subject to the SFDU

The revised HHC are based on a 200 g/day FCR as required by 38 M.R.S. §466(10-A). As noted above, EPA approved Maine's use of a 200 g/day FCR in November 2019.

Maine also used a CRL of $1x10^{-4}$ for the arsenic HHC as required by state law.[5] In waters subject to the SFDU, the HHC are intended to protect sustenance fishers. EPA evaluated whether the arsenic HHC for consumption of organisms-only protects sustenance fishers at a risk level consistent with EPA's 2000 Methodology (i.e., between $1x10^{-5}$ and $1x10^{-6}$). As discussed below, EPA concludes that it does.

There is substantial uncertainty surrounding many components of the arsenic HHC, notably the CSF and the characterization of bioconcentration/bioaccumulation. With respect to the arsenic CSF, in November 2015, EPA's Office of Research and Development (ORD) announced its plan to review the toxicological assessment of arsenic with respect to human health effects. EPA's current plan for addressing the scientific uncertainties with arsenic is described in the Assessment Development Plan for the Integrated Risk Information System (IRIS) Toxicological Review of Inorganic Arsenic (EPA/630/R-14/101 November 2015).[6]

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[4] Although footnote aME in Table 1 is only included in the column for the arsenic criteria applicable to the non-SFDU waters, the footnote text makes it clear that it also applies to the arsenic criteria applicable to the SFDU waters.

[5] Other HHC submitted by Maine use a CRL of $1x10^{-6}$. There is no federal requirement that HHC for all constituents be based on the same calculation inputs.

[6] USEPA. 2015. Draft Assessment Development Plan for the Integrated Risk Information System.

Current data indicate that the bioaccumulation rates for arsenic are variable, bioaccumulation of arsenic may be dependent on the ambient water concentration, and concentrations of inorganic arsenic in fish are low relative to concentrations of organic arsenic (organic forms of arsenic typically found in fish are not as toxic as inorganic arsenic).

EPA compiled and published available information on arsenic bioconcentration and bioaccumulation in 2003 and did not reach any conclusion regarding an appropriate single input for use in HHC derivation. A related input parameter, the IF anticipated in fish, also varies considerably between fresh and marine waters and among different classes and species of organisms. Maine's selection of a BCF of 26 and IF of 30% reflects values within the range of reasonable possibilities as reflected in current data. Other scientific data would support a BCF of 14 and IF of 4%[7]. If these alternative inputs are considered, then Maine's organism only arsenic criterion for SFDU provides greater protection than a 1 x 10^{-5} CRL.

ii. Approval Rationale for Maine's Water + Organisms Arsenic HHC for Waters Subject to the SFDU

Maine's inorganic arsenic criterion to protect human health for the consumption of water plus organisms (1.1 µg/L) is based on a drinking water rate of 2 L/day, along with the same input parameters as the criterion to protect for consumption of organisms-only, discussed above.

The water-plus-organisms criterion is intended to protect both the SFDU and the drinking water designated use. As described above, Maine's criterion of 2.6 µg/L is protective of sustenance fishers from fish consumption exposure. For the same reasons, a criterion of 1.1 µg/L is also protective of the SFDU (it is even more protective than 2.6 µg/L).

Maine's WQS state that Classes AA and A waters must be suitable for drinking water supply after disinfection, and Class B waters must be suitable for drinking water supply after treatment. See 38 M.R.S. § 465 sub-§§.1.A, 2.A, and 3.A. States have significant discretion in how they express drinking water supply uses, and many choose to express them as "after treatment," which implies ensuring protection of the finished water supply provided at the tap. Protection of the finished water supply provided at the tap is the province of the Safe Drinking Water Act (SDWA).[8] Maine's criterion of 1.1 µg/L is more protective than the MCL. On this basis, EPA approves Maine's water + organism criterion as protective of the (post-treatment) drinking water use.

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[7] For example, ODEQ (2011) reported a geometric mean BCF of 14 using four representative freshwater studies that ranged from 4-27 (see Table 6 on page 12 in Oregon Department of Environmental Quality. 2011. Draft Report Water Quality Standards Review and Recommendations: Arsenic). The BCF value of 14 is also within the range reported in USEPA (2003) for freshwater BAFs (see Table 3-9 on page 24 of USEPA. 2003. Technical Summary of Information Available on the Bioaccumulation of Arsenic in Aquatic Organisms. EPA-822-R-03-032). USEPA (1997) provides a review of IF data for arsenic and identifies 4% as a maximum value for a mixed fish and shellfish diet (see page 10 of USEPA. 1997 Arsenic and Fish Consumption. EPA-822-R-97-003).

[8] One way to protect the post-treatment drinking water use is to set the water + organism instream water quality criterion to be as stringent as the maximum contaminant level (MCL) of 10 µg/L required by the SDWA for finished water.

B. Revised HHC to Protect the Statewide Fishing Designated Use

Maine revised many of its HHC in Chapter 584, Appendix A to protect the statewide fishing designated use. The revisions result in HHC that are as stringent as, or more stringent than, EPA's recommended HHC, published pursuant to CWA Section 304(a). Maine's HHC reflect the latest scientific information and are protective of the designated use. The revised criteria are based on Maine's statewide FCR of 32.4 g/day, updated BW, DW intake, health toxicity values, BAFs, and RSCs. For carcinogens, Maine based these criteria on an incremental CRL of $1x10^{-6}$, which is consistent with EPA's 2000 Methodology.

Maine's revisions are consistent with 40 C.F.R. §§ 131.6(b), (c), and 131.11 (a) and (b)(i), and EPA hereby approves these revised criteria.[9]

C. Other Statewide HHC Applicable to Certain Waters in Indian Lands

On May 27, 2020, EPA took three actions relevant to statewide HHC for toxics that are also applicable to waters in Indian lands: EPA withdrew its February 2, 2015, interpretations and approvals of a sustenance fishing designated use for all waters in Indian lands in Maine; withdrew its associated disapproval of the application of Maine's statewide HHC for those waters; and approved Maine's statewide fishing designated use without EPA's interpretation that it means sustenance fishing for waters in Indian lands in Maine. Because Maine had recently adopted revised HHC for most toxics in February 2020, EPA decided that it would review those HHC once they were submitted to EPA, rather than review Maine's 2006 and 2013 HHC that were previously submitted to EPA but have been superseded by the 2020 HHC. That review resulted in the approvals discussed above.

In its 2020 revisions, Maine did not update its 2006 and 2013 statewide HHC that are applicable to waters not subject to the SFDU, including some waters in Indian lands, for the following pollutants: antimony, arsenic, heptachlor epoxide, manganese, nickel, nitrosamines, N-nitrosodibutylamine, N-nitrosodiethylamine, N-nitrosodimethylamine, N-nitrosodi-n-propylamine, N-nitrosodiphenylamine, polychlorinated biphenyls (PCBs), selenium, thallium, zinc, and 2,3,7,8-TCDD (dioxin).[10] Because EPA withdrew its 2015 disapprovals of these statewide HHC for application in waters in Indian lands, and because they were not superseded by Maine's 2020 revised criteria, EPA has evaluated Maine's 2006 and 2013 HHC for these pollutants (as set forth in Tables 1 and 2) to determine whether they protect the general fishing use for waters in Indian lands that are not in the SFDU subcategory. EPA approves these HHC for the reasons discussed below.

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[9] EPA also notes that these criteria, based on the FCR of 32.4 g/day and CRL of $1x10^{-6}$, will protect sustenance fishers in the non-SFDU subcategory waters (including waters in Indian lands) at an effective CRL of approximately $6.17x10^{-6}$, assuming a sustenance level FCR of 200 g/day.

[10] In addition, Maine did not revise its HHC in 2020, for asbestos, barium, copper, iron, manganese, nitrates, and N-nitrosodipyrrolidine. However, EPA previously approved the HHC for asbestos, barium, copper, iron, manganese, and nitrates for waters in Indian lands on January 19, 2016 and the HHC for N-nitrosodipyrrolidine for waters in Indian lands on April 11, 2016.

1. HHC Other Than Arsenic

    a. Maine's Criteria

Maine's 2006 HHC for antimony, heptachlor epoxide, manganese, nickel, nitrosamines, N-nitrosodibutylamine, N-nitrosodiethylamine, N-nitrosodimethylamine, N-nitrosodi-n-propylamine, N-nitrosodiphenylamine, polychlorinated biphenyls (PCBs), selenium, thallium, zinc, and 2,3,7,8-TCDD (dioxin) are all equal to or more stringent than EPA's national recommended HHC for those pollutants.

    b. Basis for EPA Approval

The science supporting EPA's national CWA Section 304(a) recommended criteria supports EPA's conclusion that Maine's criteria are protective of human health and the fishing designated use. As such, Maine's criteria are consistent with 40 C.F.R. §§ 131.6(b) and (c), and 131.11 (a) and (b)(i), and EPA hereby approves these HHC for the waters in Indian lands that are not covered by the SFDU subcategory.[11][12]

2. HHC for Arsenic

    a. Maine's Criteria

Maine's HHC for inorganic arsenic applicable to waters in Indian lands not covered by the SFDU subcategory are 1.3 µg/L for water and organism exposure and 3.7 µg/L for organism-only exposure, using a $1x10^{-4}$ CRL and a FCR of 138 g/day , a BCF of 26 L/kg, a CSF of 1.75 per mg/kg/day, an IF of 30%, a BW of 70 kg, and DW of 2 L/day. *See* Appendix A of Chapter 584, Table I, footnote aME.

    b. Basis for EPA Approval

        i. Approval Rationale for Maine's Organism-Only Arsenic HHC for Waters in Indian lands Not Subject to the SFDU

In 2011, Maine's legislature enacted LD 515, which required DEP to revise Maine's HHC for arsenic by basing it on a CRL of 1 in 10,000 ($1x10^{-4}$) rather than the previous CRL of 1 in 1,000,000 ($1x10^{-6}$). DEP adopted new criteria based on the 10^{-4} CRL, and a revised FCR of 138

[11] EPA did not update the national CWA Section 304(a) recommended criteria for thallium and dioxin in 2015 because further analysis was necessary to develop scientifically sound recommendations. Nevertheless, under the CWA, EPA has an obligation to act on Maine's HHC for thallium and dioxin. Because DEP used existing EPA data on the toxicity of thallium and dioxin and relied on the derivation methodology from EPA guidance and 304(a) recommendations, EPA approves these HHC for waters in Indian lands outside of the SFDU subcategory waters. As new information becomes available from IRIS, EPA encourages the State to consider revisions, if necessary, to incorporate the latest scientific knowledge for dioxin and thallium.

[12] EPA also notes that these criteria, based on the FCR of 32.4 g/day and CRL of 1x10-6, will protect sustenance fishers in the non-SFDU subcategory waters (including waters in Indian lands) at an effective CRL of approximately 6.17x10-6, assuming a sustenance level FCR of 200 g/day.

g/day (compared to 32.4 g/day FCR used for other toxic HHC) in order to protect highly exposed state subpopulations at the new $1x10^{-4}$ CRL. DEP submitted the revised arsenic HHC on January 14, 2013 to EPA for review and approval, and EPA approved the revised arsenic criteria for waters outside of Indian lands on May 16, 2013. EPA is now approving the statewide 3.7 µg/L organism-only criterion for application to waters in Indian lands that are not subject to the SFDU, on the same basis as set forth in the 2013 approval for waters outside of Indian lands. EPA also notes that, as discussed above in Section A.2.b.i, there are a number of scientific uncertainties associated with the HHC for arsenic.[13]

ii. Approval Rationale for Maine's Water + Organisms Arsenic HHC for Waters in Indian Lands Not Subject to the SFDU

Maine's inorganic arsenic criterion to protect human health for the consumption of waters plus organisms (1.3 µg/L) is based on a drinking water rate of 2 L/day, along with the same input parameters as the criterion to protect for consumption of organisms-only.

The water-plus-organisms criterion is intended to protect both the fish consumption use and the drinking water designated use. The criterion of 1.3 µg/L is more protective of fish consumption than the 3.7 µg/L organisms-only criterion approved above. As discussed above in Section A.2.b.ii, to protect the post-treatment drinking water use, the water + organism criterion may be set equivalent to the MCL of 10 µg/L required by the SDWA. Maine's criterion of 1.3 µg/L is nearly ten times more protective than the MCL. On this basis, EPA approves Maine's water + organism criterion for the waters in Indian lands that are outside of the SFDU subcategory waters as protective of the (post-treatment) drinking water use.

[13] EPA notes that this criterion, based on the FCR of 138 g/day and CRL of $1x10^{-4}$, will protect sustenance fishers in the non-SFDU subcategory waters (including waters in Indian lands) at an effective CRL of approximately 1.04×10^{-5}, assuming a sustenance level FCR of 200 g/day, if the alternative exposure inputs of BCF of 14 and IF of 4% as described in footnote 7 are considered.

Attachment 2 – Tables I and II from Chapter 584 Appendix A

1. Table I. Criteria for Priority Pollutant listed pursuant to 304(a) of the Clean Water Act. See also the footnotes following this table.

Priority Pollutant	CAS Number	Freshwater CMC (µg/L)	Freshwater CCC (µg/L)	Saltwater CMC (µg/L)	Saltwater CCC (µg/L)	Human Health For Consumption of: Water and Organisms (ug/L)	Human Health For Consumption of: Organisms Only (ug/L)	Sustenance Fishing Waters Human Health For Consumption of: Water and Organisms (ug/L)	Sustenance Fishing Waters Human Health For Consumption of: Organisms Only (ug/L)	FR Cite/ Source
Antimony	7440360					5.5 B, qq	350 B, qq	5 B, qq	56 B, qq	65FR66443
Arsenic	7440382	340 A,K	150 A,K	69 A,bb	36 A,bb	1.3 M,S,aME, qq	3.7 M,S, aME, qq	1.1, qq, M,S	2.6 qq, M, S	65FR31682 57FR60848
Beryllium	7440417					Z, qq	qq	Z, qq	qq	65FR31682
Cadmium	7440439	~~0.42~~ 0.40 E,~~K,bb,~~ mm	~~0.08~~ 0.22 E,~~K,bb,~~ mm	~~40~~ 33 ~~bb~~	~~8.85~~ 7.9 ~~bb~~	Z, qq	qq	Z, qq	qq	~~65FR31682 EPA-822-R-01-001~~ 81FR19176
Chromium III	16065831	483 E,K	23.1 E,K			Z Total, qq	qq	Z Total, qq	qq	EPA820/B-96-001 65FR31682
Chromium VI	18540299	16 K	11 K	1,108 bb	50 bb	Z Total, qq	qq	Z Total, qq	qq	65FR31682
Copper	7440508	3.07 E,K,cc, nn, oo	2.36 E,K,cc, nn, oo	5.78 cc,ff	3.73 cc,ff	1,300 U, qq	qq	1,300 U, qq	qq	65FR31682
Lead	7439921	10.52 E,bb,gg,rr	0.41 E,bb,gg,rr	221 bb	8.52 bb	Z		Z	Z	65FR31682
Mercury	7439976	See ~~Title~~ *Certain deposits and discharges prohibited,* 38 M.R.S.~~A~~, ~~Sections~~§ 420 (1-B) and §413(11)								

Priority Pollutant	CAS Number	Freshwater CMC (µg/L)	Freshwater CCC (µg/L)	Saltwater CMC (µg/L)	Saltwater CCC (µg/L)	Human Health For Consumption of: Water and Organisms (ug/L)	Human Health For Consumption of: Organisms Only (ug/L)	Sustenance Fishing Waters Human Health For Consumption of: Water and Organisms (ug/L)	Sustenance Fishing Waters Human Health For Consumption of: Organisms Only (ug/L)	FR Cite/ Source
Nickel	7440020	120.2 E,K	13.4 E,K	75 bb	8.28 bb	400 B, qq	1,000 B, qq	123 B, qq	149 B, qq	65FR31682
Selenium	7782492	L,R	5.0	291 bb,dd	71 bb,dd	162 Z, qq	2,250, qq	118, qq	365, qq	62FR42160 65FR31682 65FR66443
Silver	7740224	0.23 G, E		2.24 G						65FR31682
Thallium	7440280					0.17, qq	0.25, qq	0.04 qq	0.04 qq	68FR75507
Zinc	7440666	30.6 E,K,ss	30.6 E,K	95 bb	86 bb	6,000 U, qq	14,000 U, qq	1,842 qq	2,234 qq	65FR31682 65FR66443
Cyanide	57125	22 K,Q	5.2 K,Q	1 Q,bb	1 Q,bb	~~140 jj~~ 4 qq	~~140 jj~~ 300 qq	4 qq	50 qq	~~68FR75507~~ 80FR36986
Asbestos	1332214					$7x10^6$ fibers/L I		$7x10^6$ fibers/L I		57FR60848
2,3,7,8-TCDD Dioxin	1746016	Also see ~~Title~~ 38 M.R.S.~~A~~ § 420(2)				2.7E-9 J, qq	2.8E-9 J, qq	4.5E-10 J,qq	4.5E-10 J, qq	65FR66443
Acrolein	107028	3	3			~~3.9 ll~~ 3 qq	~~5.0 ll~~ 200 qq	3 qq	40 qq	~~74FR27535~~ 74FR46587 80FR36986
Acrylonitrile	107131					~~0.04 B~~ 0.061 qq	~~0.13 B~~ 4.6 qq	0.057 qq	0.74 qq	65FR66443 80FR36986
Benzene	71432					~~0.58 B~~ 0.57 qq	~~7.55 B~~ 10 qq	0.45 qq	1.7 qq	IRIS 01/19/00 65FR66443 80FR36986

Priority Pollutant	CAS Number	Freshwater CMC (µg/L)	Freshwater CCC (µg/L)	Saltwater CMC (µg/L)	Saltwater CCC (µg/L)	Human Health For Consumption of: Water and Organisms (ug/L)	Human Health For Consumption of: Organisms Only (ug/L)	Sustenance Fishing Waters Human Health For Consumption of: Water and Organisms (ug/L)	Sustenance Fishing Waters Human Health For Consumption of: Organisms Only (ug/L)	FR Cite/ Source
Bromoform	75252					~~4.2B~~ 6.8 qq	~~73 B~~ 77 qq	4.6 qq	12 qq	65FR66443 80FR36986
Carbon Tetrachloride	56235					~~0.23 B~~ 0.4 qq	~~0.89 B~~ 3 qq	0.2 qq	0.5 qq	65FR66443 80FR36986
Chlorobenzene	108907					~~120 B, U, Z~~ 100 qq	~~840 B,U~~ 600 qq	50 qq	90 qq	68FR75507 80FR36986
Chlorodibromomethane	124481					~~0.40 B~~ 0.79 qq	~~6.94 B~~ 14 qq	0.61 qq	2.2 qq	65FR66443 80FR36986
Chloroethane	75003									
2-Chloroethylvinyl Ether	110758									
Chloroform	67663					~~5.4 P~~ 60 qq	~~94 P~~ 2000 qq	50 qq	200 qq	~~62FR42160~~ 80FR36986
Dichlorobromomethane	75274					~~0.53 B~~ 0.93 qq	~~9.3 B~~ 18 qq	0.73 qq	2.9 qq	65FR66443 80FR36986
1,1-Dichloroethane	75343									
1,2-Dichloroethane	107062					~~0.38 B~~ 9.9 qq	~~19.8 B~~ 430 qq	8.8 qq	69 qq	65FR66443 80FR36986
1,1-Dichloroethylene	75354					~~320 Z~~ 300 qq	~~3,900~~ 10000 qq	300 qq	2000 qq	~~68FR75507~~ 80FR36986
1,2-Dichloropropane	78875					~~0.50 B~~ 0.89 qq	~~7.9 B~~ 20 qq	0.72 qq	3.3 qq	65FR66443 80FR36986
1,3-Dichloropropene	542756					~~0.34~~ 0.26 qq	~~11.4 B~~ 7.7 qq	0.22 qq	1.2 qq	~~68FR75507~~ 80FR36986

Priority Pollutant	CAS Number	Freshwater		Saltwater		Human Health For Consumption of:		Sustenance Fishing Waters Human Health For Consumption of:		FR Cite/ Source
		CMC (µg/L)	CCC (µg/L)	CMC (µg/L)	CCC (µg/L)	Water and Organisms (ug/L)	Organisms Only (ug/L)	Water and Organisms (ug/L)	Organisms Only (ug/L)	
Ethylbenzene	100414					~~435~~ 53 qq	~~1,150~~ 83 qq	12 qq	13 qq	~~68FR75507~~ 80FR36986
Methyl Bromide	74839					~~46 B~~ 100 qq	~~800 B~~ 8000 qq	100 qq	1000 qq	65FR66443 80FR36986
Methyl Chloride	74873									65FR31682
Methylene Chloride	75092					~~4.6 B~~ 20 qq	~~320 B~~ 800 qq	10 qq	100 qq	65FR66443 80FR36986
1,1,2,2-Tetrachloroethane	79345					~~0.16 B~~ 0.2 qq	~~2.2 B~~ 2 qq	0.1 qq	0.3 qq	65FR66443 80FR36986
Tetrachloroethylene	127184					~~0.59~~ 8.6 qq	~~1.77~~ 19 qq	2.6 qq	3.1 qq	65FR66443 80FR36986
Toluene	108883					~~1,200 Z~~ 54 qq	~~8,100~~ 340 qq	30 qq	55 qq	~~68FR75507~~ 80FR36986
1,2-Trans-Dichloroethylene	156605					~~140 Z~~ 100 qq	~~5,500~~ 2000 qq	100 qq	400 qq	~~68FR75507~~ 80FR36986
1,1,1-Trichloroethane	71556					Z	Z	Z	Z	65FR31682
1,1,2-Trichloroethane	79005					~~0.58 B~~ 0.53 qq	~~8.42 B~~ 5.8 qq	0.36 qq	0.95 qq	65FR66443 80FR36986
Trichloroethylene	79016					~~2.37~~ 0.6 qq	~~16.2~~ 4 qq	0.3 qq	0.7 qq	65FR66443 80FR36986
Vinyl Chloride	75014					~~0.025~~ 0.022 qq	~~1.32~~ 1.1 qq	0.02 qq	0.17 qq	~~68FR75507~~ 80FR36986

Priority Pollutant	CAS Number	Freshwater CMC (µg/L)	Freshwater CCC (µg/L)	Saltwater CMC (µg/L)	Saltwater CCC (µg/L)	Human Health For Consumption of: Water and Organisms (ug/L)	Human Health For Consumption of: Organisms Only (ug/L)	Sustenance Fishing Waters Human Health For Consumption of: Water and Organisms (ug/L)	Sustenance Fishing Waters Human Health For Consumption of: Organisms Only (ug/L)	FR Cite/ Source
2-Chlorophenol	95578					~~55.2 B,U~~ 30 qq	~~80.6 B,U~~ 500 qq	20 qq	90 qq	65FR66443 80FR36986
2,4-Dichlorophenol	120832					~~63.3 B,U~~ 10 qq	~~160 B,U~~ 40 qq	5 qq	6 qq	65FR66443 80FR36986
2,4-Dimethylphenol	105679					~~280 B~~ 100 qq	~~460 B,U~~ 2000 qq	90 qq	300 qq	65FR66443 80FR36986
2-Methyl-4,6-Dinitrophenol	534521					~~12.5~~ 2 qq	~~155~~ 20 qq	1 qq	3 qq	65FR66443 80FR36986
2,4-Dinitrophenol	51285					~~68.4 B~~ 10 qq	~~2,900 B~~ 200 qq	10 qq	40 qq	65FR66443 80FR36986
2-Nitrophenol	88755									
4-Nitrophenol	100027									
3-Methyl-4-Chlorophenol	59507					~~U~~ 500 qq	~~U~~ 2000 qq	200 qq	300 qq	80FR36986
Pentachlorophenol	87865	8.72 F,K	6.69 F,K	13 bb	7.9 bb	~~0.25 B~~ 0.02 qq	~~1.64 B,H~~ 0.02 qq	0.004 qq	0.004 qq	65FR66443 65FR31682 80FR36986
Phenol	108952					~~10,514~~ 4,000 ~~B,~~U,~~H~~ qq	~~462,963~~ 200,000 ~~B,~~U,~~H~~ qq	4000 qq	30,000 qq	~~74FR27535~~ 80FR36986

Priority Pollutant	CAS Number	Freshwater		Saltwater		Human Health For Consumption of:		Sustenance Fishing Waters Human Health For Consumption of:		FR Cite/ Source
		CMC (µg/L)	CCC (µg/L)	CMC (µg/L)	CCC (µg/L)	Water and Organisms (ug/L)	Organisms Only (ug/L)	Water and Organisms (ug/L)	Organisms Only (ug/L)	
2,4,6-Trichlorophenol	88062					~~0.93 B~~ 1.1 qq	~~1.31 B~~ 1.8 qq	0.27 qq	0.3 qq	65FR66443 80FR36986
Acenaphthene	83329					~~430 B,U~~ 50 qq	~~540 B,U~~ 60 qq	9 qq	9 qq	65FR66443 80FR36986
Acenaphthylene	208968									
Anthracene	120127					~~7,100 B~~ 200 qq	~~22,000 B~~ 200 qq	40 qq	40 qq	65FR66443 80FR36986
Benzidine	92875					~~0.00006 B~~ 0.00014 qq	~~0.0001 B~~ 0.0069 qq	0.00013 qq	0.0011 qq	65FR66443 80FR36986
Benzo(a)Anthracene	56553					~~0.003 B~~ 0.00085 qq	~~0.01 B~~ 0.00087 qq	0.00014 qq	0.00014 qq	65FR66443 80FR36986
Benzo(a)Pyrene	50328					~~0.003 B~~ 0.000085 qq	~~0.01 B~~ 0.000087 qq	0.000014 qq	0.000014	65FR66443 80FR36986
Benzo(b)Fluoranthene	205992					~~0.003 B~~ 0.00085 qq	~~0.01 B~~ 0.00087 qq	0.00014 qq	0.00014 qq	65FR66443 80FR36986
Benzo(ghi)Perylene	191242									
Benzo(k)Fluoranthene	207089					~~0.003 B~~ 0.0085 qq	~~0.01 B~~ 0.0087 qq	0.0014 qq	0.0014 qq	65FR66443 80FR36986
Bis2-ChloroethoxyMethane	111911									

Priority Pollutant	CAS Number	Freshwater CMC (µg/L)	Freshwater CCC (µg/L)	Saltwater CMC (µg/L)	Saltwater CCC (µg/L)	Human Health For Consumption of: Water and Organisms (ug/L)	Human Health For Consumption of: Organisms Only (ug/L)	Sustenance Fishing Waters Human Health For Consumption of: Water and Organisms (ug/L)	Sustenance Fishing Waters Human Health For Consumption of: Organisms Only (ug/L)	FR Cite/ Source
Bis2-ChloroethylEther	111444					~~0.029 B~~ 0.03 qq	~~0.28 B~~ 1.4 qq	0.027 qq	0.23 qq	65FR66443 80FR36986
Bis2-ChloroisopropylEther	108601					~~1,350 B~~ 200 qq	~~35,000 B~~ 2000 qq	200 qq	400 qq	65FR66443 80FR36986
Bis2-EthylhexylPhthalate[X]	117817					~~0.8 B~~ 0.22 qq	~~1.19 B~~ 0.25 qq	0.04 qq	0.04 qq	65FR66443 80FR36986
4-BromophenylPhenylEther	101553									
Butylbenzyl Phthalate[W]	85687					~~900 B~~ 0.068 qq	~~1,050 B~~ 0.068 qq	0.011 qq	0.011 qq	65FR66443 80FR36986
2-Chloronaphthalene	91587					~~650 B~~ 600 qq	~~850 B~~ 800 qq	100 qq	100 qq	65FR66443 80FR36986
4-ChlorophenylPhenylEther	7005723									
Chrysene	218019					~~0.003 B~~ 0.085 qq	~~0.01 B~~ 0.087 qq	0.014 qq	0.014 qq	65FR66443 80FR36986
Dibenzo(a,h)Anthracene	53703					~~0.003 B~~ 0.000085 qq	~~0.01 B~~ 0.000087 qq	0.000014 qq	0.000014 qq	65FR66443 80FR36986
1,2-Dichlorobenzene	95501					~~330~~ 1000 qq	~~700~~ 2000 qq	300 qq	400 qq	~~68FR75507~~ 80FR36986
1,3-Dichlorobenzene	541731					~~250~~ 6 qq	~~520~~ 9 qq	1 qq	2 qq	65FR31682 80FR36986

Priority Pollutant	CAS Number	Freshwater CMC (µg/L)	Freshwater CCC (µg/L)	Saltwater CMC (µg/L)	Saltwater CCC (µg/L)	Human Health For Consumption of: Water and Organisms (ug/L)	Human Health For Consumption of: Organisms Only (ug/L)	Sustenance Fishing Waters Human Health For Consumption of: Water and Organisms (ug/L)	Sustenance Fishing Waters Human Health For Consumption of: Organisms Only (ug/L)	FR Cite/ Source
1,4-Dichlorobenzene	106467					~~50~~ 300 qq	~~105~~ 600 qq	80 qq	100 qq	~~68FR75507~~ 80FR36986
3,3'-Dichlorobenzidine	91941					~~0.013 B~~ 0.042 qq	~~0.015 B~~ 0.097 qq	0.013 qq	0.016 qq	65FR66443 80FR36986
Diethyl Phthalate[W]	84662					~~13,000 B~~ 400 qq	~~24,000 B~~ 400 qq	70 qq	70 qq	65FR66443 80FR36986
Dimethyl Phthalate[W]	131113					~~221,000~~ 1000 qq	~~600,000~~ 1000 qq	200 qq	200 qq	65FR66443 80FR36986
Di-n-Butyl Phthalate[W]	84742					~~1,400 B~~ 20 qq	~~2,400 B~~ 20 qq	3 qq	3 qq	65FR66443 80FR36986
2,4-Dinitrotoluene	121142					~~0.11~~ 0.048 qq	~~1.83~~ 1.1 qq	0.039 qq	0.18 qq	65FR66443 80FR36986
2,6-Dinitrotoluene	606202									
Di-n-Octyl Phthalate	117840									
1,2-Diphenylhydrazine	122667					~~0.03 B~~ 0.03 qq	~~0.11 B~~ 0.1 qq	0.01 qq	0.02 qq	65FR66443 80FR36986
Fluoranthene	206440					~~71 B~~ 10 qq	~~75 B~~ 10 qq	2 qq	2 qq	65FR66443 80FR36986
Fluorene	86737					~~950 B~~ 40 qq	~~2,100 B~~ 50 qq	7 qq	7 qq	65FR66443 80FR36986

Priority Pollutant	CAS Number	Freshwater		Saltwater		Human Health For Consumption of:		Sustenance Fishing Waters Human Health For Consumption of:		FR Cite/ Source
		CMC (µg/L)	CCC (µg/L)	CMC (µg/L)	CCC (µg/L)	Water and Organisms (ug/L)	Organisms Only (ug/L)	Water and Organisms (ug/L)	Organisms Only (ug/L)	
Hexachlorobenzene	118741					~~0.0002 B~~ 0.000052 qq	~~0.0002 B~~ 0.000052 qq	0.0000084 qq	0.0000084 qq	65FR66443 80FR36986
Hexachlorobutadiene	87683					~~0.43 B~~ 0.006 qq	~~9.96 B~~ 0.006 qq	0.001 qq	0.001 qq	65FR66443 80FR36986
Hexachlorocyclopentadiene	77474					~~39 U~~ 2 qq	~~600 U~~ 3 qq	0.4 qq	0.4 qq	~~68FR75507~~ 80FR36986
Hexachloroethane	67721					~~1.04 B~~ 0.08 qq	~~1.78 B~~ 0.09 qq	0.01 qq	0.01 qq	65FR66443 80FR36986
Indeno(1,2,3-cd)Pyrene	193395					~~0.003 B~~ 0.00085 qq	~~0.01 B~~ 0.00087 qq	0.00014 qq	0.00014 qq	65FR66443 80FR36986
Isophorone	78591					~~35 B~~ 34 qq	~~520 B~~ 1200 qq	30 qq	200 qq	65FR66443 80FR36986
Naphthalene	91203									
Nitrobenzene	98953					~~16.7 B~~ 10 qq	~~370 B,H~~ 400 qq	10 qq	60 qq	65FR66443 80FR36986
N-Nitrosodimethylamine	62759					0.00069 B, qq	1.63 B, qq	0.00068 B, qq	0.26 B, qq	65FR66443
N-Nitrosodi-n-Propylamine	621647					0.005 B, qq	0.27 B, qq	0.004 B, qq	0.04 B,qq	65FR66443
N-Nitrosodiphenylamine	86306					2.23 B, qq	3.24 B, qq	0.49 B, qq	0.53 B, qq	65FR66443

Priority Pollutant	CAS Number	Freshwater CMC (µg/L)	Freshwater CCC (µg/L)	Saltwater CMC (µg/L)	Saltwater CCC (µg/L)	Human Health For Consumption of: Water and Organisms (ug/L)	Human Health For Consumption of: Organisms Only (ug/L)	Sustenance Fishing Waters Human Health For Consumption of: Water and Organisms (ug/L)	Sustenance Fishing Waters Human Health For Consumption of: Organisms Only (ug/L)	FR Cite/ Source
Phenanthrene	85018									
Pyrene	129000					~~710 B~~ 20 qq	~~2,160 B~~ 20 qq	3 qq	3 qq	65FR66443 80FR36986
1,2,4-Trichlorobenzene	120821					~~25~~ 0.048 qq	~~38~~ 0.05 qq	0.008 qq	0.0081 qq	~~68FR75507~~ 80FR36986
Aldrin	309002	3.0 G		1.3 G		~~0.000027 B~~ 0.00000051 qq	~~0.000027 B~~ 0.00000051 qq	0.000000082 qq	0.000000082 qq	65FR31682 65FR66443 80FR36986
alpha-BHC	319846					~~0.0017 B~~ 0.00024 qq	~~0.0026 B~~ 0.00026 qq	0.000041 qq	0.000041 qq	65FR66443 80FR36986
beta-BHC	319857					~~0.006 B~~ 0.0062 qq	~~0.009 B~~ 0.0093 qq	0.0014 qq	0.0015 qq	65FR66443 80FR36986
gamma-BHC (Lindane)	58899	0.95 K		0.16 G		~~0.68 Z~~ 2.8 qq	~~0.1~~ 2.9 qq	0.47 qq	0.47 qq	~~68FR75507~~ 80FR36986
delta-BHC	319868									
Chlordane	57749	2.4 G	0.0043 G,aa	0.09 G	0.004 G, aa	~~.00044~~ 0.00021 qq	~~0.00044~~ 0.00021 qq	0.000034 qq	0.000034 qq	65FR31682 65FR66443 80FR36986

Priority Pollutant	CAS Number	Freshwater CMC (µg/L)	Freshwater CCC (µg/L)	Saltwater CMC (µg/L)	Saltwater CCC (µg/L)	Human Health For Consumption of: Water and Organisms (ug/L)	Human Health For Consumption of: Organisms Only (ug/L)	Sustenance Fishing Waters Human Health For Consumption of: Water and Organisms (ug/L)	Sustenance Fishing Waters Human Health For Consumption of: Organisms Only (ug/L)	FR Cite/ Source
4,4'-DDT	50293	1.1 G,ii	0.001 G,aa,ii	0.13 G,ii	0.001 G,aa,ii	~~0.00012 B~~ 0.00002 qq	~~0.00012 B~~ 0.00002 qq	0.0000032 qq	0.0000032 qq	65FR31682 65FR66443 80FR36986
4,4'-DDE	72559					~~0.00012 B~~ 0.000012 qq	~~0.00012 B~~ 0.000012 qq	0.0000019 qq	0.0000019 qq	65FR66443 80FR36986
4,4'-DDD	72548					~~0.00017 B~~ 0.000082 qq	~~0.00017 B~~ 0.000082 qq	0.000013 qq	0.000013 qq	65FR66443 80FR36986
Dieldrin	60571	0.24 K	0.056 K,O	0.71 G	0.0019 G,aa	~~0.000029 B~~ 0.00000082 qq	~~0.000029 B~~ 0.00000082 qq	0.00000013 qq	0.00000013 qq	65FR31682 65FR66443 80FR36986
alpha-Endosulfan	959988	0.22 G,Y	0.056 G,Y	0.034 G,Y	0.0087 G,Y	~~39 B~~ 10 qq	~~48 B~~ 20 qq	3 qq	3 qq	65FR31682 65FR66443 80FR36986
beta-Endosulfan	33213659	0.22 G,Y	0.056 G,Y	0.034 G,Y	0.0087 G,Y	~~39 B~~ 20 qq	~~48 B~~ 30 qq	4 qq	5 qq	65FR31682 65FR66443 80FR36986
Endosulfan Sulfate	1031078					~~39 B~~ 20 qq	~~48 B~~ 30 qq	4 qq	4 qq	65FR66443 80FR36986
Endrin	72208	0.086 K	0.036 K,O	0.037 G	0.0023 G,aa	~~0.032~~ 0.02 qq	~~0.032~~ 0.02 qq	0.004 qq	0.004 qq	~~68FR75507~~ 80FR36986

Priority Pollutant	CAS Number	Freshwater CMC (µg/L)	Freshwater CCC (µg/L)	Saltwater CMC (µg/L)	Saltwater CCC (µg/L)	Human Health For Consumption of: Water and Organisms (ug/L)	Human Health For Consumption of: Organisms Only (ug/L)	Sustenance Fishing Waters Human Health For Consumption of: Water and Organisms (ug/L)	Sustenance Fishing Waters Human Health For Consumption of: Organisms Only (ug/L)	FR Cite/ Source
Endrin Aldehyde	7421934					~~0.16 B~~ 0.7 qq	~~0.16 B,H~~ 0.8 qq	0.1 qq	0.1 qq	65FR66443 80FR36986
Heptachlor	76448	0.52 G	0.0038 G,aa	0.053 G	0.0036 G,aa	~~0.000043 B~~ 0.0000039 qq	~~0.000043 B~~ 0.0000039 qq	0.00000063 qq	0.00000063 qq	65FR31682 65FR66443 80FR36986
Heptachlor Epoxide	1024573	0.52 G,V	0.0038 G,V,aa	0.053 G,V	0.0036 G,V,aa	0.000021 B, qq	0.000021 B, qq	0.0000034 qq	0.0000034 qq	65FR31682 65FR66443 80FR36986
Polychlorinated Biphenyls PCBs~~:~~			0.014 N,aa		0.03 N,aa	0.000035 B,N, qq	0.000035 B,N, qq	0.0000056 B, N, qq	0.0000056 B, N, qq	65FR31682 65FR66443
Toxaphene	8001352	0.73	0.0002 aa	0.21	0.0002 aa	~~0.00015 B~~ 0.00046 qq	~~0.000155 B~~ 0.00047 qq	0.000076 qq	0.000076 qq	65FR31682 65FR66443 80FR36986

Footnotes to Table I:

A. This recommended water quality criterion was derived from data for arsenic (III), but is applied here to total arsenic, which might imply that arsenic (III) and arsenic (V) are equally toxic to aquatic life and that their toxicities are additive. In the arsenic criteria document (EPA 440/5-84-033, January 1985), Species Mean Acute Values are given for both arsenic (III) and arsenic (V) for five species and the ratios of the SMAVs for each species range from 0.6 to 1.7. Chronic values are available for both arsenic (III) and arsenic (V) for one species; for the fathead minnow, the chronic value for arsenic (V) is 0.29 times the chronic value for arsenic (III). No data are known to be available concerning whether the toxicities of the forms of arsenic to aquatic organisms are additive.

B. This criterion has been revised to reflect The Environmental Protection Agency's q1* or RfD, as contained in the Integrated Risk Information System (IRIS) as of May 17, 2002. The fish tissue bioconcentration factor (BCF)from the 1980 Ambient Water Quality Criteria document was retained in each case.

E. The freshwater criterion for this metal is expressed as a function of hardness (mg/L) in the water column. The value given here corresponds to a hardness of 20 mg/L. Also see part 7 ~~below.~~ under "Additional Notes" after Table II.

F. Freshwater aquatic life values for pentachlorophenol are expressed as a function of pH, and are calculated as follows: CMC = exp(1.005(pH)-4.869);CCC = exp(1.005(pH)-5.134). Values displayed in table correspond to a pH of 7.0.

G. This Criterion is based on 304(a) aquatic life criterion issued in 1980, and was issued in one of the following documents: Aldrin/Dieldrin (EPA 440/5-80-019), Chlordane (EPA 440/5-80-027), DDT (EPA 440/5-80-038), Endosulfan (EPA440/5-80-046), Endrin (EPA440/5-047), Heptachlor (440/580-052), Hexachlorocyclohexane (EPA440/5-80-054), Silver (EPA 440/5-80-071). The Minimum Data Requirements and derivation procedures were different in the 1980 Guidelines than in the 1985 Guidelines. For example, a "CMC" derived using the 1980 Guidelines was derived to be used as an instantaneous maximum. If assessment is to be done using an averaging period, the values given should be divided by 2 to obtain a value that is more comparable to a CMC derived using the 1985 Guidelines.

~~H. No criterion for protection of human health from consumption of aquatic organisms excluding water was present in the 1980 criteria document or in the *1986 Quality Criteria for Water*. Nevertheless, sufficient information was presented in the 1980 document to allow the calculation of a criterion, even though the results of such a calculation were not shown in the document.~~

I. This criterion for asbestos is the Maximum Contaminant Level (MCL) developed under the Safe Drinking Water Act.

J. These values are not applicable to bleach ~~karft~~ kraft pulp mills. See 38 M.R.S.~~A.~~, section 420(2)(I).

K. This recommended criterion is based on a 304(a) aquatic life criterion that was issued in the *1995 Updates: Water Quality Criteria Documents for the Protection of Aquatic Life in Ambient Water*, (EPA-820-B-96-001, September 1996). This value was derived using the GLI Guidelines (60FR15393-15399, March 23, 1995; 40CFR132 Appendix A); the difference between the 1985 Guidelines and the GLI Guidelines are explained on page iv of the 1995 Updates. None of the decisions concerning the derivation of this criterion were affected by any considerations that are specific to the Great Lakes.

L. The CMC = 1/[(f1/CMC1) + (f2/CMC2)] where f1 and f2 are the fractions of total selenium that are treated as selenite and selenate, respectively, and CMC1 and CMC2 are 185.9 µg/l and 12.83 µg/l, respectively.

M. EPA is currently reassessing the criteria for arsenic.

N. This criterion applies to total PCBs (e.g. the sum of all congener or all isomer or homolog or Aroclor analyses).

O. The derivation of the CCC for this pollutant did not consider exposure through the diet, which is probably important for aquatic life occupying upper trophic levels.

P. Although a new RfD is available in IRIS, the surface water criteria will not be revised until the National Primary Drinking Water Regulations: Stage 2 Disinfectants and Disinfection Byproducts Rule (Stage 2 DBPR) is completed, since public comment on the relative source contribution (RSC) for chloroform is anticipated.

Q. This recommended water quality criterion is expressed as µg free cyanide (as CN)/L.

R. This value for Selenium was announced (61FR58444-58449, November 14, 1996) as a proposed GLI 303(c) aquatic life criterion. EPA is currently working on this criterion and so this value might change substantially in the near future.

S. This recommended water quality criterion refers to the inorganic form only.

U. The organoleptic effect criterion is more stringent than the value for priority toxic pollutants. Also see Part 6.

V. This value was derived from data for heptachlor and the criteria document provides insufficient data to estimate the relative toxicities of heptachlor and heptachlor epoxide.

W. Although EPA has not published a final criteria document for this compound, it is EPA's understanding that sufficient data exist to allow calculation of aquatic criteria. It is anticipated that industry intends to publish in the peer reviewed literature draft aquatic life criteria generated in accordance with EPA Guidelines. EPA will review such criteria for possible issuance as national WQC.

X. There is a full set of aquatic life toxicity data that show that BEHP is not toxic to aquatic organisms at or below its solubility limit.

Y. This value was derived from data for endosulfan and is most appropriately applied to the sum of alpha- endosulfan and beta-endosulfan.

Z. A more stringent MCL has been issued. Also see part 6 below.

aa This criterion is based on a 304(a) aquatic life criterion issued in 1980 or 1986, and in one of the following documents: Aldrin/Dieldrin (EPA 440/5-80-019), Chlordane (EPA 440/5-80-027), DDT (EPA 440/5-80-038), Endrin (EPA 440/5-80-047), Heptachlor (EPA 440/5-80-052), Polychlorinated Biphenyls (EPA 440/5-80-019), Toxaphene (EPA 440/5-86-038). The CCC is currently based on the Final Residual Value (FRV) procedure. Since the publication of the Great Lakes Aquatic Criteria Guidelines in 1995 (60FR15393-15399, March 23, 1995), the Agency no longer uses the FRV procedure for deriving CCCs for new or revised 304(a) aquatic life criteria. Therefore, the Agency anticipates that future revisions of this CCC will not be based on the FRV procedure.

bb This water quality criterion is based on a 304(a) aquatic life criterion that was derived using the 1985 Guidelines (*Guidelines for Deriving Numerical NationalWater Quality Criteria for the Protection of Aquatic Organisms and Their Uses*, PB85-227049, January 1985) and was issued in one of the following criteria documents: Arsenic (EPA 440/5-84-033), ~~Cadmium (EPA 440/5-84-032)~~, Chromium (EPA 440/5-84-029), Copper (EPA 440/5-84-031), Cyanide (EPA 440/5-84-028), Lead (EPA 440/5-84-027), Nickel (EPA 440/5-86-004), Pentachlorophenol (EPA 440/5-86-009), Toxaphene, (EPA 440/5-86-006), Zinc (EPA 440/5-87- 003).

cc When the concentration of dissolved organic copper is elevated, copper is substantially less toxic and use of Water~~-~~ Effect~~s~~ Ratio~~s~~ might be appropriate.

dd The selenium criteria document (EPA 440/5-87-006, September 1987) provides that if selenium is as toxic to saltwater fishes in the field as it is to freshwater fishes in the field, the status of the fish community should be monitored whenever the concentration of selenium exceeds 5.0 µg/L in ~~salt water~~ saltwater because the saltwater CCC does not take into account uptake via the food chain.

ff This recommended water quality criterion was derived in *Ambient Water Quality Criteria Saltwater Copper Addendum* (Draft, April 14, 1995) and was promulgated in the Interim final National Toxics Rule (60FR22228-222237, May 4, 1995).

gg EPA is actively working on this criterion and so this recommended water quality criterion may change substantially in the near future.

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

jj. This criterion is expressed as total cyanide, even though the IRIS RfD used to derive the criterion is based on free cyanide. The multiple forms of cyanide that are present in ambient water have significant differences in toxicity due to their differing abilities to liberate the CN-moiety. Some complex cyanides require even more extreme condition the refluxing with sulfuric acid to liberate the CN-moiety. Thus these complex cyanides are expected to have little or no 'bioavailability' to humans. If a substantial fraction of the cyanide present in water body is present in a complex form (e.g. $Fe_4[Fe(CN)_6]_3$), this recommended criterion ~~mat~~ may be over conservative.

~~ll. This criterion has been revised to reflect the Environmental Protection Agency's cancer slope factor (CSF) or reference dose (RfD), as contained in the Integrated Risk Information System (IRIS) as of (Final FR Notice June 10, 2009). The fish tissue bioconcentration factor (BCF) from the 1980 Ambient Water Quality Criteria document was retained in each case.~~

aME As noted in 06-096 CMR 584.4 and CMR 584.5.C, when calculating ambient water quality (human health) criteria for inorganic arsenic, a 10^{-4} risk level and a state-wide consumption value of 138 grams of organisms per day shall be utilized. In waters subject to a designated use of sustenance fishing as specified under 38 MRS §465-A(1)(D), 38 MRS §467(7)(A)(B)(D), 38 MRS §467(13), 38 MRS §467 (15)(C), 38 MRS §467(15)(A)(E)(F), 38 MRS §468(8), 38 MRS §469(7), a fish consumption rate of 200 grams per day shall be used. Other values specific to inorganic arsenic shall include a bioconcentration factor of 26 L/kg, a cancer slope (potency) factor of 1.75 mg/kg/day, and an inorganic factor of 30%.

mm. When calculating acute and chronic permit limits for the Androscoggin River, use a Water Effect Ratio (WER) of 1.3 for acute and 3.0 for chronic for cadmium. Rationale for the WERs is provided in *Androscoggin River Water Effect Ratios* (Integral Consulting Inc., April 13, 2015). WER is defined as an appropriate measure of the toxicity of a material obtained in on site water divided by the same measure of the toxicity of the same material obtained simultaneously in laboratory dilution water.

When calculating acute permit limits for the St. Croix River, use a Water Effect Ratio (WER) of 1.2 for acute for cadmium. Rationale for the WERs is provided in *St. Croix River Water-Effect Ratios* (Integral Consulting, Inc., July 2019). WER is defined as an appropriate measure of the toxicity of a material obtained in onsite water divided by the same measure of the toxicity of the same material obtained simultaneously in laboratory dilution water.

nn. When calculating acute and chronic permit limits for the Androscoggin River, use a Water Effect Ratio (WER) of 2.5 for acute and 2.5 for chronic for copper. The final WER for chronic copper was determined to be 3.5, however, 2.5 is used to prevent the chronic criteria from exceeding the acute criteria. Rationale for the WERs is provided in *Androscoggin River Water Effect Ratios* (Integral Consulting Inc., April 13, 2015). WER is defined as an appropriate measure of the toxicity of a material obtained in on site water divided by the same measure of the toxicity of the same material obtained simultaneously in laboratory dilution water.

When calculating acute permit limits for the St. Croix River, use a Water Effect Ratio (WER) of 3.0 for acute for copper. Rationale for the WERs is provided in *St. Croix River Water-Effect Ratios* (Integral Consulting, Inc., July 2019). WER is defined as an appropriate measure of the toxicity of a material obtained in onsite water divided by the same measure of the toxicity of the same material obtained simultaneously in laboratory dilution water.

oo. When calculating acute and chronic permit limits for total copper in the Little Androscoggin River from the outfall of the Paris Utility District in Paris, to the confluence of the Little Androscoggin River with the main stem Androscoggin River in Auburn, the ambient water quality criteria (AWQC) for acute exposure must be 10.85 micrograms per liter (µg/L) and the chronic AWQC must be 6.78 µg/L. Rationale for the previously noted AWQCs is based on the Biotic Ligand Model (BLM) that is summarized in the Board of Environmental Protection (BEP) Final Order for the Paris Utility District dated November 20, 2014. As stated in the aforementioned Final Order "The copper BLM calculates metal toxicity to aquatic organisms as a function of simultaneous concentrations of chemical constituents in water that can either compete with copper and render it biologically unavailable, or compete with copper for binding sites at the point of entry into a vulnerable organism."

qq. Human Health Ambient Water Quality Criteria: 2015 Update. EPA 820-F-15-001. It should be noted that EPA used a fish consumption rate of 22 g/day to calculate their 2015 values, however the criteria listed here are calculated using a fish consumption rate of 32.4 g/day, generally, and 200 g/day for waters subject to a designated use of sustenance fishing. It should also be noted that antimony, arsenic, barium, beryllium, cadmium, chromium (III or VI), copper, manganese, nickel, nitrates, nitrosamines, N-nitrosodibutylamine, N-nitrosodiethylamine, N-nitrosodipyrrolidine, N-nitrosodimethylamine, N-nitrosodi-n-propylamine, N-nitrosodiphenylamine, polychlorinated biphenyls (PCBs), selenium, thallium, zinc, or 2,3,7,8-TCDD (dioxin) were not included in the 2015 EPA update due to ongoing research.

rr. When calculating acute and chronic permit limits for the St. Croix River, use a Water Effect Ratio (WER) of 3.0 for acute and 4.8 for chronic for lead. Rationale for the WERs is provided in *St. Croix River Water-Effect Ratios* (Integral Consulting, Inc., July 2019). WER is defined as an appropriate measure of the toxicity of a material obtained in onsite water divided by the same measure of the toxicity of the same material obtained simultaneously in laboratory dilution water.

ss. When calculating acute permit limits for the St. Croix River, use a Water Effect Ratio (WER) of 2.0 for acute for zinc. Rationale for the WERs is provided in *St. Croix River Water-Effect Ratios* (Integral Consulting, Inc., July 2019). WER is defined as an appropriate measure of the toxicity of a material obtained in onsite water divided by the same measure of the toxicity of the same material obtained simultaneously in laboratory dilution water.

2. Table II. Criteria for Non-Priority Pollutants. See also the footnotes following this table.

Non Priority Pollutant	CAS Number	Freshwater		Saltwater		Human Health For Consumption of:		Sustenance Fishing Waters Human Health For Consumption of:		FR Cite/Source
		CMC (µg/L)	CCC (ug/L)	CMC (µg/L)	CCC (ug/L)	Water and Organisms (µg/L)	Organisms Only (ug/L)	Water and Organisms (µg/L)	Organisms Only (ug/L)	
Aluminum pH 6.5 - 9.0	7429905	750 G,O, P	87 G,L,O,P							53FR33178
Ammonia	7664417	~~24,100~~ 11,000 D	~~3,000~~ 1,400 D	7,300 D	1,100 D					EPA822-R-99-014 EPA440-588-004 EPA822-R-13-001
Barium	7440393					1,000 A, qq		1,000 A, qq		Gold Book
Boron		Narrative Statement – See document								Gold Book
Carbaryl	63-25-2	2.1	2.1	1.6						77FR30280
Chloride	16887006	860,000 G	230,000 G							53FR19028
Chlorine	7782505	19	11	13	7.5	C				Gold Book
Chlorophenoxy Herbicide 2,4,5,-TP	93721					~~10 A~~ 100 qq	300 qq	40 qq	40 qq	~~Gold Book~~ 80FR36986
Chlorophenoxy Herbicide 2,4,D	94757					~~100 A,C~~ 1200 qq	8000 qq	670 qq	1300 qq	~~Gold Book~~ 80FR36986
Chloropyrifos	2921882	0.083 G	0.041 G	0.011 G	0.0056 G					Gold Book
Demeton	8065483		0.1 F		0.1 F					Gold Book

Non Priority Pollutant	CAS Number	Freshwater		Saltwater		Human Health For Consumption of:		Sustenance Fishing Waters Human Health For Consumption of:		FR Cite/Source
		CMC (µg/L)	CCC (ug/L)	CMC (µg/L)	CCC (ug/L)	Water and Organisms (µg/L)	Organisms Only (ug/L)	Water and Organisms (µg/L)	Organisms Only (ug/L)	
Ether, Bis Chloromethyl	542881					~~0.000079 E~~ 0.00015 qq	~~0.00016 E~~ 0.011 qq	0.00014 qq	0.0018 qq	65FR66443 80FR36986
Guthion	86500		0.01 F		0.01 F					Gold Book
Hexachlorocyclo-hexane-Technical	~~319868~~ 608731					~~0.0123~~ 0.0049 qq	~~0.0414~~ 0.0067 qq	0.001 qq	0.0011 qq	80FR36986 EPA 440/5-80-054
Iron	7439896		1000 F			300 A				Gold Book
Malathion	121755		0.1 F		0.1 F					Gold Book
Manganese	7439965					B, qq	100 A, qq	B, qq	100 A, qq	Gold Book
Methoxychlor	72435		0.03 F		0.03 F	~~100 A,C~~ 0.01 qq	0.01 qq	0.002 qq	0.002 qq	~~Gold Book~~ 80FR36986
Mirex	2385855		0.001 F		0.001 F					Gold Book
Nitrates	14797558					10,000 A, qq	qq	10,000 A, qq	qq	Gold Book
Nitrosamines						0.0008 A, qq	1.24 qq	0.0008 A, qq	1.24 qq	Gold Book
Dinitrophenols	25550587					~~68~~ 10 qq	~~2,860~~ 700 qq	10 qq	100 qq	65FR66443 80FR36986
Nonylphenol	84852153	28	6.6	7	1.7					71FR9337
Nitrosodibutylamine, N	924163					0.0061 A, qq	0.118 A, qq	0.0048 A, qq	0.019 A, qq	65FR66443

Non Priority Pollutant	CAS Number	Freshwater CMC (µg/L)	Freshwater CCC (ug/L)	Saltwater CMC (µg/L)	Saltwater CCC (ug/L)	Human Health For Consumption of: Water and Organisms (µg/L)	Human Health For Consumption of: Organisms Only (ug/L)	Sustenance Fishing Waters Human Health For Consumption of: Water and Organisms (µg/L)	Sustenance Fishing Waters Human Health For Consumption of: Organisms Only (ug/L)	FR Cite/Source
Nitrosodiethylamine, N	55185					0.0008 A, qq	1.24 A, qq	0.0008 A, qq	1.24 A, qq	Gold Book
Nitrosopyrrolidine,N	930552					0.016, qq	18.4, qq	0.016, qq	3.0, qq	65FR66443
Diazanon	333415	0.17	0.17	0.82	0.82					71FR9336
Parathion	56382	0.065 J	0.013 J							Gold Book
Pentachlorobenzene	608935					~~0.79 E~~ 0.07 qq	~~0.81 E~~ 0.07 qq	0.01 qq	0.01 qq	65FR66443 80FR36986
Sulfide-Hydrogen Sulfide	7783064		2.0 F		2.0 F					Gold Book
Tetrachlorobenzene, 1,2,4,5-	95943					~~0.55 E~~ 0.02 qq	~~0.58 E~~ 0.02 qq	0.003 qq	0.003 qq	65FR66443 80FR36986
Tributyltin TBT		0.46 Q	0.072 Q	0.42 Q	0.0074 Q					69FR342
Trichlorophenol,2,4,5	95954					~~1,300 B,E~~ 200 B, qq	~~2,000 B,E~~ 400 B, qq	60 qq	60 qq	65FR66443 80FR36986

Footnotes to Table II:

A This human health criterion is the same as originally published in the Red Book (EPA 440/9-76-023, July 1976) which predates the 1980 methodology and did not utilize the fish ingestion BCF approach. This same criterion value is now published in the Gold Book (Quality Criteria for Water: 1986. EPA 440/5-86-001).

B The organoleptic effect criterion is more stringent than the value presented in the non priority pollutant table.

C A more stringent Maximum Contaminant Level (MCL) has been issued by EPA under the Save Drinking Water Act. Refer to drinking water regulations 40CFR141 or Safe Drinking Water Hotline (1-800-426-4791) for values. Also see part 6 below.

D Total Ammonia Nitrogen Aquatic life criteria are pH, temperature and/or salinity dependent. See part 7(C) for fresh water and reference document for marine waters. The values presented in the table are based on pH of 7.0 and temperature of 25ºC in fresh waters; and pH of 8.0, temperature of 20ºC and salinity of 30 parts per thousand in marine waters.

E This criterion has been revised to reflect The Environmental Protection Agency's q1* or RfD, as contained in the Integrated Risk Information System (IRIS) as of May 17, 2002. The fish tissue bioconcentration factor (BCF) used to derive the original criterion was retained in each case.

F The derivation of this value is presented in the Red Book (EPA 440/9-76-023, July, 1976).

G This value is based on a 304(a) aquatic life criterion that was derived using the 1985 Guidelines (*Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses*, PB85-227049, January 1985) and was issued in one of the following criteria documents: Aluminum (EPA 440/5-86-008); Chloride (EPA 440/5-88-001); Chloropyrifos (EPA 440/5-86-005).

J This value is based on a 304(a) aquatic life criterion that was issued in the *1995 Updates: Water Quality Criteria Documents for the Protection of Aquatic Life in Ambient Water* (EPA-820-B-96-001). This value was derived using the GLI Guidelines (60FR15393-15399, March 23, 1995; 40CFR132 Appendix A); the differences between the 1985 Guidelines and the GLI Guidelines are explained on page iv of the 1995 Updates. No decision concerning this criterion was affected by any considerations that are specific to the Great Lakes.

L There are three major reasons why the use of Water-Effect Ratios might be appropriate. (1) The value of 87 µg/l is based on a toxicity test with the striped bass in water with pH= 6.5-6.6 and hardness <10 mg/L. Data in "Aluminum Water-Effect Ratio for the 3M Plant Effluent Discharge, Middleway, West Virginia" (May 1994) indicate that aluminum is substantially less toxic at higher pH and hardness, but the effects of pH and hardness are not well quantified at this time. (2) In tests with the brook trout at low pH and hardness, effects increased with increasing concentrations of total aluminum even though the concentration of dissolved aluminum was constant, indicating that total recoverable is a more appropriate measurement than dissolved, at least when particulate aluminum is primarily aluminum hydroxide particles. In surface waters, however, the total recoverable procedure might measure aluminum associated with clay particles, which might be less toxic than aluminum associated with aluminum hydroxide. (3) EPA is aware of field data indicating that many high quality waters in the U.S. contain more than 87 µg aluminum/L, when either total recoverable or dissolved is measured.

N This value was announced (62FR42554, August 7, 1997) as a proposed 304(a) aquatic life criterion. Although EPA has not responded to public comment, EPA has published this as a 304(a) criterion as guidance for States and Tribes to consider when adopting water quality criteria.

O When calculating acute and chronic permit limits for the Androscoggin River, use a Water Effect Ratio (WER) of 1.3 for acute and 3.7 for chronic for aluminum. Rationale for the WERs is provided in *Androscoggin River Water Effect Ratios* (Integral Consulting Inc., April 13, 2015).

P When calculating acute and chronic permit limits for the St. Croix River, use a Water Effect Ratio (WER) of 6.1 for aluminum. Rationale for the WER is provided in *Aluminum Water-Effect Ration for Georgia-Pacific Corporation Woodland, Maine Pulp & Paper Operations Discharge and St. Croix River* prepared by AScI Corporation/AScI-Duluth dated November 1996, and summarized in the letter from William R. Beckwith of EPA Region 1 to Barry Mower, DEP, dated March 2, 1998.