Association of Washington Business

Attached please find additional documents submitted in support of Association of Washington Business' comment letter.

State of Oregon Department of Environmental Quality

Notice of Proposed Rulemaking

March 15, 2024

Aquatic Life Toxics Criteria Rulemaking 2024

This package contains the following documents:

- Notice of Rulemaking
- Draft Rules – Edits Highlighted
- Draft Rules – Edits Included (final clean version)

Note for Readers:

This package contains multiple documents. If you want to read more than one document at a time, you can open multiple copies of this PDF by downloading the PDF and then opening it in Adobe. You can then either:

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Introduction

DEQ invites public input on proposed permanent rule amendments to Chapter 340 Division 41 of the Oregon Administrative Rules.

Request for Other Options

During the public comment period, DEQ asks for public comment on whether there are other options for achieving the rules' substantive goals while reducing the rules' negative economic impact on business.

Overview

DEQ proposes that the Environmental Quality Commission adopt amendments to the state's water quality standards. The amendments update Oregon's aquatic life toxics criteria based on the latest scientific information.

An additional amendment removes non-regulatory aquatic life guidance values from rule for consistency and clarity.

Short summary of proposed rule changes

The proposed amendments update Table 30 Aquatic Life Water Quality Criteria for Toxic Pollutants in OAR 340-041-8033. The proposed rules add or update aquatic life criteria for six toxic chemicals (acrolein, aluminum, cadmium, carbaryl, diazinon, and tributyltin) to protect fish and aquatic life beneficial uses in Oregon. These criteria updates are based on EPA's most recent criteria recommendations.

An additional proposed amendment removes Table 31 Aquatic Life Water Quality Guidance Values for Toxic Pollutants from OAR 340-041-8033 and corresponding references in OAR 340-041-0033. These values are non-regulatory and non-binding. Therefore, they do not need to be in rule and are being removed for clarity.

Background of reasons for doing this rulemaking

EPA periodically releases national recommendations for aquatic life criteria that States and Tribes may use to develop water quality standards. These recommendations are based on the latest science and are designed to protect the aquatic community from short and/or long term negative chemical effects. Once EPA publishes criteria recommendations for a chemical, states must either adopt the new criteria or justify not doing so during their Triennial Review.

Oregon's aquatic life criteria were last comprehensively reviewed and updated in 2004. As part of DEQ's 2021 Water Quality Standards Triennial Review, DEQ committed to reviewing several

of EPA's new or updated aquatic life criteria recommendations and considering them for adoption. DEQ also decided to compare all of EPA's current aquatic life criteria recommendations with the state's criteria to keep Oregon's criteria up to date with EPA's most recent recommendations and the latest science.

DEQ is proposing to remove Table 31 Aquatic Life Water Quality Guidance Values for Toxic Pollutants from rule because these values are not regulatory criteria and are outdated. Removing Table 31 from rule will improve water quality standards rule clarity without causing a regulatory impact.

How this rulemaking addresses the reasons for doing the rulemaking

As a result of this comprehensive review, DEQ is proposing to adopt EPA's most up-to-date aquatic life criteria recommendations for six chemicals (listed above). Adding or updating these criteria in Oregon's water quality standards will provide increased protection for Oregon fish and aquatic life and ensure clarity, consistency, and certainty for entities regulated under the Clean Water Act. These numeric criteria values will be used in DEQ's water quality programs to determine waterbody impairment, pollution control measures, and permit limits.

Key policy and technical issues

1. A key technical issue for this rulemaking is that two of the pollutants with criteria are equation-based. Four of the pollutants with proposed criteria (acrolein, carbaryl, diazinon, and tributyltin) have singular criteria magnitude values that do not vary with water chemistry. In contrast, criteria magnitude values for freshwater aluminum and cadmium are equation-based and vary with water chemistry parameters. Aluminum criteria magnitudes can be calculated by inputting pH, dissolved organic carbon, and total hardness measurements from a given site and time. Cadmium criteria magnitudes vary based on hardness at a site and time. Oregon water quality standards already contain other equation-based criteria that vary with water chemistry (e.g., freshwater copper, other hardness-based metals).

2. Aluminum and cadmium equation-based criteria are already being implemented in Oregon waters as a result of past federal promulgations by U.S. EPA. Once proposed aluminum and cadmium criteria are adopted into Oregon rule and approved by EPA, these criteria will continue to be implemented in the same way.

Affected parties

The proposed rulemaking applies statewide to all Oregon waters with fish and aquatic life beneficial uses. The proposed new or updated numeric criteria values will be used in DEQ's water quality programs to determine waterbody impairment, pollution control measures, and permit limits. Affected parties could include entities that discharge wastewater under a general or individual NPDES permit. These criteria updates could require more investment in monitoring, investigation, and action to address the exceedances (education/outreach, source control, or other

best management practices) for affected entities. Members of the public who rely on fish and aquatic life commercially, recreationally, or for Tribal use may benefit from the proposed rules because they ensure protection of fish and aquatic life in Oregon waters.

Outreach efforts and public and stakeholder involvement

DEQ announced the beginning of the rulemaking, and the first and second rulemaking advisory committee meetings via GovDelivery. Through the GovDelivery announcements, DEQ invited the public to virtually attend both rulemaking advisory committee meetings. DEQ also added advisory committee meeting announcements to DEQ's calendar of public meetings.

DEQ provided letters announcing the aquatic life toxics criteria rulemaking to all Oregon tribes in August 2023 and invited tribal governments to engage with the rulemaking process via DEQ's tribal liaison.

Brief summary of fiscal impact

The proposed rule amendments add or update aquatic life criteria for a limited number of toxic chemicals in Oregon water quality standards. The criteria for aluminum and cadmium are already in effect in Oregon as a result of federal promulgations. In these cases, adopting the proposed criteria into state rule will have no fiscal impact. DEQ is proposing to add new or updated criteria for acrolein, carbaryl, diazinon, and tributyltin to Oregon's state rule. The proposed rule amendments may affect state agencies, local governments, and small and large businesses that discharge wastewater under general or individual NPDES permits or participate in activities that result in nonpoint source runoff of these pollutants into waterbodies. These entities may be required to monitor for additional toxic substances, meet permit limits, or engage in alternative best management practices to maintain compliance. Members of the public who rely on fish and aquatic life commercially, recreationally, or for Tribal use may benefit economically from the proposed rules because they ensure protection of health for fish and aquatic life in Oregon waters. Overall, the limited scope of the proposed rule amendments combined with generally low concentrations of these chemicals in Oregon waters makes a large fiscal and economic impact unlikely.

Procedural Summary

More information

Information about this rulemaking is on this rulemaking's web page: Aquatic Life Toxics Criteria 2024 Rulemaking

Public Hearings

DEQ plans to hold one public hearing. Anyone can attend a hearing by webinar or teleconference.

Date: Tuesday, April 23, 2024
Start time: 4 p.m.

Join via Zoom
(**NOTE:** If this link does not work, you can type in this web address: https://us02web.zoom.us/j/83557593542)

Join by phone:
Teleconference phone number: 833 928 4609 US Toll-free
Meeting ID: 835 5759 3542

Instructions on how to join webinar or teleconference: Instructions

How to comment on this rulemaking proposal

DEQ is asking for public comment on the proposed rules. Anyone can submit comments and questions about this rulemaking. DEQ will accept comments by email, postal mail or verbally at the public hearing.

- **Email:** Send comments by email to: Aquatic.Life2024@DEQ.oregon.gov
- **Postal mail:** Oregon DEQ, Attn: Mailea Miller-Pierce/Water Quality Standards, 700 NE Multnomah Street, Suite 600, Portland, Oregon 97232-4100
- **At public hearing:** 4 p.m., Tuesday, April 23, 2024

Comment deadline

DEQ will only consider comments on the proposed rules that DEQ receives by **5 p.m., on Friday, May 3, 2024**.

Note for public university students:

ORS 192.345(29) allows Oregon public university and OHSU students to protect their university email addresses from disclosure under Oregon's public records law. If you are an Oregon public university or OHSU student, notify DEQ that you wish to keep your email address confidential.

Sign up for rulemaking notices

Get email or text updates about this rulemaking by either:

- Signing up through this link: GovDelivery;
- Signing up on the rulemaking web site: Aquatic Life Toxics Criteria 2024 Rulemaking

What will happen next?

Following the close of the public comment period, DEQ will prepare a written response to comments that will be included in a staff report DEQ will submit to the Environmental Quality Commission. DEQ may modify the rule proposal based on the comments.

Proposed rules only become effective if the Environmental Quality Commission adopts them and applicable for Clean Water Act purposes once they are subsequently approved by the U.S. EPA. DEQ's intended action is to present the proposed rule changes to the EQC as soon as possible after the earliest date on which the rule changes could take effect. DEQ intends to submit the proposed rule changes to the EQC on or after September 2024.

Statement of need

Proposed Rule or Topic	Discussion
Aquatic Life Toxics Criteria Update	
What need would the proposed rule address?	The aquatic life criteria for toxic substances protect fish and aquatic life beneficial uses in Oregon waters. The criteria were last comprehensively reviewed and updated by the state in 2004. Since that time, EPA has released new or updated criteria recommendations for several chemicals based on the latest science. Updating Oregon's aquatic life criteria based on the latest science will improve protection of fish and aquatic life beneficial uses in Oregon waters.
How would the proposed rule address the need?	The proposed rule contains new or updated aquatic life criteria for six toxic chemicals based on EPA's most recent recommendations.
How will DEQ know the rule addressed the need?	The new and updated criteria will be incorporated into Oregon water quality standards and utilized in Clean Water Act implementation programs.
Removal of Guidance Values for Toxic Pollutants from Rule	
What need would the proposed rule address?	The proposed rule will address the need for clarity and consistency for Clean Water Act implementation. The Table 31 Aquatic Life Water Quality Guidance Values for Toxic Pollutants are non-regulatory and should therefore not be included in rule language.
How would the proposed rule address the need?	The proposed rule would remove Table 31 values from rule language as well as corresponding references to Table 31.
How will DEQ know the rule addressed the need?	DEQ will know the rule addresses the need once the non-regulatory guidance values are removed from the Oregon water quality

Proposed Rule or Topic	Discussion
	standards rule language and if it clarifies to other WQ programs and the public what pollutants DEQ regulates to protect aquatic life.

Federal relationship

ORS 183.332, 468A.327 and OAR 340-011-0029 require DEQ to attempt to adopt rules that correspond with existing equivalent federal laws and rules unless there are reasons not to do so.

The proposed rules would implement federal requirements in 40 CFR 131.11. Under the federal Clean Water Act, the state is required to adopt criteria to protect designated uses, including fish and aquatic life use. States are directed to use EPA 304(a) criteria recommendations or other scientifically defensible methods to establish numeric criteria values to protect designated uses. The proposed criteria are consistent with the EPA recommended criteria.

Rules affected, authorities, supporting documents

Lead division

Water Quality

Program or activity

Water Quality Standards

Chapter 340 action

Amend				
340-041-0033	340-041-8033			

Statutory Authority - ORS				
468.020	468B.030	468B.035	468B.048	

Statutes Implemented - ORS				
468B.030	468B.035	468B.048		

Documents relied on for rulemaking

Document title	Document location
Aluminum Aquatic Life Standard Missing Parameters Document, February 2024	https://www.oregon.gov/deq/rulemaking/Pages/AquaticLife2024.aspx
Water Quality Standards Aquatic Life Toxics Criteria Update 2024 Issue Paper	https://www.oregon.gov/deq/rulemaking/Pages/AquaticLife2024.aspx
Ambient Aquatic Life Water Quality Criteria for Acrolein, July 2009	https://www.epa.gov/sites/default/files/2018-12/documents/ambient-wqc-acrolein.pdf
Final Aquatic Life Ambient Water Quality Criteria for Aluminum 2018, December 2018	https://www.epa.gov/sites/default/files/2018-12/documents/aluminum-final-national-recommended-awqc.pdf
Aquatic Life Ambient Water Quality Criteria Cadmium – 2016, March 2016	https://www.epa.gov/sites/default/files/2016-03/documents/cadmium-final-report-2016.pdf
Final National Recommended Ambient Water Quality Criteria for Carbaryl, May 2012	https://www.regulations.gov/document/EPA-HQ-OW-2011-0787-0006

Aquatic Life Ambient Water Quality Criteria Diazinon Final, December 2005	https://www.epa.gov/sites/default/files/2019-03/documents/ambient-wqc-diazinon-final.pdf
Ambient Aquatic Life Water Quality Criteria for Tributyltin (TBT) – Final, December 2003	https://www.epa.gov/sites/default/files/2019-02/documents/ambient-wqc-tributyltin-final.pdf
Federal Aluminum Aquatic Life Criteria Applicable to Oregon, March 2021	https://www.federalregister.gov/documents/2021/03/19/2021-05428/federal-aluminum-aquatic-life-criteria-applicable-to-oregon
Aquatic Life Criteria for cadmium in Oregon, February 2017	https://www.federalregister.gov/documents/2017/02/03/2017-02283/aquatic-life-criteria-for-cadmium-in-oregon
Center for Biological Diversity v. United States Environmental Protection Administration, et al. Np. CV-22-00138-TUC-JCH	Oregon DEQ 700 NE Multnomah Street, Suite 600 Portland, OR 97232-4100
Other documents referenced within Aluminum Aquatic Life Standard Missing Parameters Document, February 2024 and Water Quality Standards Aquatic Life Toxics Criteria Update 2024 Issue Paper	https://www.oregon.gov/deq/rulemaking/Pages/AquaticLife2024.aspx

Fee Analysis

This rulemaking does not involve fees.

Statement of fiscal and economic impact

The proposed rule includes new or revised aquatic life criteria for six chemicals. Adding these criteria will improve protections for fish and aquatic life and provide added clarity, consistency, and certainty for entities regulated under the Clean Water Act. Adopting the proposed criteria into Oregon's aquatic life criteria may trigger regulatory consideration for these chemicals in Clean Water Act program implementation, which includes determining water body impairment, permit limits, and pollution control measures. Initially, the primary direct economic impact of adopting these criteria may be additional monitoring costs for some regulated entities. Additional costs may also impact some regulated entities and could include capital investment needed for new treatments, implementation of best management practices, source control or other regulatory requirements. However, DEQ anticipates that the limited scope of the proposed new and revised criteria for these six toxic substances will cause few entities to be economically impacted by the proposed criteria changes. Not all of these chemicals are priority pollutants; meaning the U.S. EPA regulates and has developed analytical test methods for them. These chemicals also generally occur at low concentrations in Oregon according to the available surface water and discharge data. Furthermore, DEQ notes that adopting the proposed criteria will add protection for fish and aquatic life in Oregon waters, which may result in an economic (but sometimes non-monetizable) benefit for the public well as groups that fish commercially, recreationally, or for Tribal use.

Fiscal and Economic Impact

The following section describes the fiscal and economic impact of adopting aquatic life criteria for six chemicals into Oregon Table 30 water quality standards and removing Table 31 from rule.

- No expected fiscal and economic impacts from adopting freshwater aluminum and acute cadmium criteria into Oregon rule because those criteria are already effective and being implemented in Oregon for Clean Water Act purposes as a result of a prior federal promulgation. DEQ intends to apply and implement these criteria in the same manner that it is applying and implementing the federal criteria.
- A minimal increase in the resources required by DEQ's water quality program to assess and review attainment of these criteria within Oregon's waters under the Clean Water Act.
- A potential increase in the monitoring requirements for local governments and large and small businesses that hold individual NPDES permits. Estimated costs for initial additional monitoring for an industrial or major domestic discharger may range from: $0 to $8,300 over a five-year permitting cycle. Those costs could increase if DEQ finds that a facility has reasonable potential to discharge any of these pollutants at a level likely to cause a waterbody to exceed water quality standards, requiring establishment of a limit in the facility's permit, which would require additional monitoring by the facility. The need for and cost of any additional monitoring is not quantifiable at this time. Additional monitoring for local governments holding stormwater or municipal storm sewer permits will not be directly triggered by the proposed criteria but may be required to if these entities are contributing to water quality criteria exceedances. The cost of that monitoring cannot be determined at this time.

- A potential increase in capital investment needed for new treatments and/or implementation of new best management practices, source control implementation, or other approaches required to meet general and/or individual NPDES permit requirements for the proposed criteria. These costs could affect state agencies, local governments, and large and small businesses, but are not quantifiable at this time. However, the limited scope of aquatic life criteria addressed in this rulemaking, along with the limited regulatory requirements for dischargers to monitor pesticide concentrations in their wastewater may lessen the potential economic burden of compliance for affected entities.
- A potential economic benefit for the public and groups that rely on fish and aquatic life commercially, recreationally, or for Tribal uses.
- Additional costs to regulated parties beyond potential additional monitoring are not possible to practicably estimate at this time given program and case-specific requirements for Clean Water Act implementation. Other factors, such as the effect of climate change on Oregon waters or population growth, may also impact the cost of implementation, but those costs cannot be practicably estimated at this time.
- No fiscal or economic impact from removing Table 31 aquatic life guidance values from Oregon water quality standards because these values are not regulatory criteria.

Statement of Cost of Compliance

State agencies

Oregon Department of Environmental Quality

The proposed criteria revisions will affect DEQ's water quality programs that implement water quality standards under the Clean Water Act. Effects on DEQ's water quality programs are discussed below.

Permitting

Adopting the proposed aquatic life criteria could require additional resources from the permitting program to apply the criteria and/or evaluate reasonable potential for a discharge to cause a waterbody to exceed the criteria. Both general and individual NPDES permits require staff resources to review water quality criteria and determine what limits should apply. However, the full fiscal impact of reviewing and implementing additional criteria cannot be fully estimated until permits are renewed and each permittee's application is reviewed with knowledge of their processes and site-specific information.

The proposed acrolein criteria and saltwater cadmium criteria are not expected to require additional permitting resources to implement because Oregon has existing aquatic life criteria (saltwater cadmium) and human health criteria (acrolein) for these chemicals, and these chemicals are already regularly considered in permits.

For the proposed new pesticide criteria (carbaryl, diazinon, and tributyltin), additional permitting resources may be required on a case-by-case basis, although permittees will not typically be required to monitor for those chemicals in discharges because they are not priority pollutants and unlikely to be present in most facilities' discharges.

Assessment

Adopting the proposed aquatic life criteria are not expected to significantly impact the assessment program. The criteria will be assessed in the same manner as other aquatic life toxics criteria and will therefore not require development of a new assessment methodology to address the changes.

It is unlikely that the proposed saltwater criteria will cause additional impairment listings for saltwater cadmium. The proposed criteria are only slightly lower than the current effective criteria in saltwater. A limited data analysis of 110 saltwater cadmium measurements from Oregon waters revealed that the ambient measurements were consistently below the proposed criteria (*Water Quality Standards Aquatic Life Toxics Criteria Update 2024: Issue Paper, Discussion Draft*). However, the effect of the proposed cadmium criteria cannot be fully evaluated until they are considered during the assessment process.

Oregon currently has fresh and saltwater criteria for tributyltin. Only the proposed saltwater chronic criterion will become more stringent, which could lead to identifying some waters as impaired under CWA section 303(d). Currently, there are no 303(d) listings for tributyltin, and because the existing and proposed saltwater chronic criteria are similar, the proposed criteria are not expected to result in 303(d) listings for tributyltin.

For acrolein, carbaryl, and diazinon, which will be new aquatic life criteria in Oregon, it is possible that the criteria would trigger new listings to the 303(d) list of impaired waters for these parameters. However, a preliminary analysis (*Water Quality Standards Aquatic Life Toxics Criteria Update 2024: Issue Paper*) by the Water Quality Standards program found that carbaryl was only definitively measured in ambient waters above the proposed criteria in one sample out of over 6,000 samples. For diazinon, only 36 ambient water quality samples of more than 8,000 across the state were definitively above the proposed freshwater criteria, and none of the fifty-six saltwater samples collected to date exceeded the proposed saltwater diazinon criteria. For acrolein, none of the 91 ambient measurements in Oregon freshwaters were definitively higher than criteria. Although a full assessment must be completed to understand the impact of adopting these criteria into Oregon rule, preliminary data show that it is unlikely that adding these criteria will trigger 303(d) listings.

TMDL

It is unlikely that adopting the proposed aquatic life criteria lead to additional 303(d) listings. However, if additional 303(d) listings do occur, the TMDL program may be affected. As with other programs, it is not possible to quantify the effect of adopting these criteria at this time.

Oregon Department of Agriculture

Adopting the proposed aquatic life criteria could affect the Oregon Department of Agriculture (ODA) if it impacts how ODA manages and implements pesticide and agricultural water quality programs to regulate pollution from acrolein, cadmium (near saltwater), carbaryl, diazinon, and/or tributyltin. There is potential for the proposed rule changes to affect ODA regulatory programs, or other fiscal and economic impacts. The full fiscal impact of any potential impacts are not practicably quantifiable at this time. However, a preliminary analysis by DEQ revealed

that for most of the chemicals with proposed criteria, concentrations were generally below criteria levels in ambient surface waters and discharges (see *Water Quality Standards Aquatic Life Toxics Criteria Update 2024: Issue Paper*).

Oregon Department of Transportation

Adopting the proposed aquatic life criteria could affect the Oregon Department of Transportation (ODOT). ODOT uses pesticides to manage roads and adjacent areas which potentially includes acrolein, carbaryl, diazinon, and/or tributyltin. There is potential for the proposed rule changes to affect ODOT costs, operations, or other fiscal and economic impacts. However, there is not sufficient information to identify or quantify potential impacts at this time.

Oregon Department of Forestry

Adopting the proposed aquatic life criteria could affect the Oregon Department of Forestry (ODF). ODF may use pesticides in the management of state forest lands and also implements a forest water quality program that regulates pesticide use by private land owners, which could include pollution from acrolein, cadmium (near saltwater), carbaryl, diazinon, and/or tributyltin. There is potential for the proposed rule changes to affect ODF costs, operations, regulatory programs, or other fiscal and economic impacts. However, there is not sufficient information to identify or quantify potential impacts at this time.

Oregon Department of Fish and Wildlife

Adopting the proposed aquatic life criteria could affect the Oregon Department of Fish and Wildlife (ODFW). ODFW may use pesticides which potentially include acrolein, carbaryl, diazinon, and/or tributyltin, in the management of state lands. ODFW also holds NPDES discharge permits for some facilities (fish hatcheries). There is potential for the proposed rule changes to affect ODFW costs, operations, or other fiscal and economic impacts. However, there is not sufficient information to identify or quantify potential impacts at this time.

Additionally, adopting the proposed aquatic life criteria will provide an added benefit to protection of fish and aquatic life, which serves ODFW's mission "to protect and enhance Oregon's fish and wildlife and their habitats for use and enjoyment by present and future generations." However, the economic impact of any potential costs or benefits is not quantifiable at this time.

Local governments

Local governments that hold general permits and/or individual NPDES permits may be required to improve best management practices or wastewater treatment methods if they discharge the pollutant and have reasonable potential to exceed the new or more stringent aquatic life criteria. Major domestic dischargers may be responsible for additional monitoring costs ranging from $0 to $8,300 every 5 years to provide data to DEQ for reasonable potential analysis. If DEQ determines there is reasonable potential for discharge of a pollutant to cause a waterbody to exceed one of the new criteria being proposed, then individual dischargers may be required to

monitor their discharge more frequently, which will result in increased monitoring costs, although it is not possible to reasonably estimate additional costs at this time. If a limit is applied as the result of the proposed rule and can't immediately be achieved, , then major domestic dischargers may incur additional costs to invest in new treatment processes to achieve compliance. Local governments that hold individual municipal separate storm sewer system (also called MS4) permits may not initially be required to monitor for the pesticides with proposed criteria but are required to consider these chemicals in their monitoring plans. If the MS4 permittee is found to be contributing to the exceedance of water quality standards, they may be required to implement source control measures, alter best management practices or conduct additional monitoring. However, it is not possible to estimate the cost of those measures at this time.

Nearly all local governments with an individual major domestic NPDES permit are already required to monitor acrolein in their wastewater. Major domestic dischargers are not usually required to monitor carbaryl, diazinon, and tributyltin, and available data in Oregon show carbaryl and diazinon levels are typically below the proposed criteria in ambient waters and industrial and domestic discharges. Individual permittees that discharge cadmium into saltwater are rare, and the proposed criteria are only slightly more stringent than existing criteria in Oregon, so the cost of compliance is not expected to significantly increase due to the proposed saltwater cadmium criteria.

Although the effects of the proposed rule on local governments holding general permits cannot be fully assessed until each general permit is evaluated, the impact of the proposed rule on compliance with several general permits may be estimated. Local governments that hold general permits for stormwater discharge (1200-Z, 1200-A, 1200-C) are not likely to be affected by the proposed criteria because acrolein, carbaryl, diazinon, and tributyltin are not included in those permits, and the small change in saltwater cadmium criteria is unlikely to significantly impact general permit holders. Local governments with municipal separate storm sewer general permits (MS4) or general permits for pesticide application (2000-J, 2300-A) may be required to conduct monitoring, investigate instances of elevated pollutant concentrations in surface waters and stormwater, and take necessary action to address any exceedances of water quality criteria through education/outreach, source control, or other best management practices. While available industrial and domestic point source discharge and surface water data are generally below the proposed criteria levels, concentrations of these chemicals in Oregon industrial stormwater and municipal storm sewers represent significant data gaps. While these data gaps make it difficult to estimate the full fiscal and economic impacts of the proposed criteria on local governments, the adoption of these criteria will not automatically trigger required water quality monitoring costs for local governments holding general or individual MS4 permits. The cost of any future investigation and remediation to address potential exceedances cannot be practicably estimated at this time.

Public

The public will benefit from the proposed criteria through increased fish and aquatic life beneficial use protection. The criteria will provide a regulatory mechanism to prevent an increase in the discharge of pollutants that could impact the health of fish, shellfish, and other aquatic life

in Oregon. This may protect ecosystem function and contribute to healthier fisheries overall. Members of the public who rely on fish and aquatic life commercially, recreationally, or for Tribal use may benefit economically from the proposed rules.

The proposed rules may also generally provide increased social benefits, such as increased aquatic ecosystem health, which are difficult to monetarily quantify, but are essential for the maintenance and success of the salmon fisheries natural resource in the Pacific Northwest and the general health of aquatic organisms in Oregon water bodies.

Members of the public may incur increased indirect costs through the increase of sewer rates if treatment upgrades are required by municipal wastewater treatment facilities. However, upgrades resulting from these criteria are not expected to be common, and the cost is not quantifiable at this time.

Large businesses - businesses with more than 50 employees

Large businesses may incur increased costs due to application of the revised criteria if their wastewater discharge permits must be modified to require upgraded wastewater treatment systems and additional monitoring of effluent discharges. Large businesses may also be affected if their business activities are covered under a general permit, and they are required to implement additional monitoring or treatment to comply with the conditions of the permit. The effects of the proposed rule on large businesses are generally the same as those described for local governments with major individual permit monitoring requirements.

Small businesses – businesses with 50 or fewer employees

Small businesses may incur increased costs due to application of the revised criteria if their wastewater discharge permits must be modified to require upgraded wastewater treatment systems and additional monitoring of effluent discharges. Small businesses may also be affected if their business activities are covered under a general permit, and they are required to implement additional monitoring or treatment to comply with the conditions of the permit. The effects of the proposed rule on small businesses are generally the same as those described for local governments and large businesses.

However, small businesses may be less likely to hold individual NPDES permits, and they are more likely to discharge directly into municipal sewer collection systems. Small businesses may incur increased indirect costs through the increase of fees if treatment upgrades are required by municipal wastewater treatment facilities. However, upgrades resulting from these criteria are not expected to be common or significant, and the cost is not quantifiable at this time.

ORS 183.336 Cost of Compliance Effect on Small Businesses

a. Estimated number of small businesses and types of businesses and industries with small businesses subject to proposed rule.

It is not possible to estimate the number of small businesses that would be subject to new limits in permits until those permits are fully evaluated at the time of renewal. However, only small businesses that hold individual NPDES permits may be subject to direct monitoring and treatment costs for wastewater discharges. Small businesses with general permits may be subject to increased implementation of best management practices to remain compliant with the permit.

Small businesses that produce or make significant use of the pesticides included in this rulemaking (acrolein, carbaryl, diazinon, tributyltin) would potentially be affected by increased regulatory requirements. Small businesses that rely heavily on combustion processes could be subject to increased regulatory requirements for discharging acrolein, although Oregon's existing human health criteria for acrolein are likely to already be considered in those permits. Further, any small business that is involved in mining or battery production and discharged cadmium waste into saltwater could be affected by new regulatory requirements. DEQ is not aware of any facility currently meeting this description. However, it is not possible to estimate the number of small businesses that would be affected at this time.

b. Projected reporting, recordkeeping and other administrative activities, including costs of professional services, required for small businesses to comply with the proposed rule.

Small businesses that hold individual NPDES permits may be required to monitor for the proposed chemicals in their discharges and regularly report those data to DEQ which could result in additional administrative costs. However, small businesses meeting those permit conditions are likely to already be monitoring for acrolein and cadmium because they are priority pollutants with existing criteria. Those small businesses would only be required to monitor and report carbaryl, diazinon, and tributyltin if knowledge of process indicates they are expected to discharge those chemicals. The increase in administrative costs associated with this rule are not quantifiable at this time, but they are anticipated to be low and/or only apply to a limited number of small businesses.

c. Projected equipment, supplies, labor and increased administration required for small businesses to comply with the proposed rule.

If equipment, supplies, labor, or increased administration is required, it would be only for select small businesses likely to have these chemicals in their discharge at levels with the potential to exceed the criteria in their receiving water. This is expected to be rare and the costs for these businesses to comply is not quantifiable at this time.

d. Describe how DEQ involved small businesses in developing this proposed rule.

DEQ included representatives from the Pacific Coast Federation of Fishermen's Associations, the Oregon Farm Bureau, the Oregon Forest & Industries Council, Oregon Business & Industry as rulemaking advisory committee members to provide input on the fiscal and economic impacts of the proposed rules as relevant to the sectors represented by those organizations.

Documents relied on for fiscal and economic impact

Document title	Document location
Water Quality Standards Aquatic Life Toxics Criteria Update *2024: Issue Paper,* Discussion Draft	Oregon DEQ Rulemaking Page: https://www.oregon.gov/deq/rulemaking/Pages/AquaticLife2024.aspx
Email Communication and Virtual Meetings, DEQ's Water Quality Permitting Program employees	Oregon DEQ 700 NE Multnomah Street, Suite 600 Portland, OR 97232-4100
Email and Phone Communication with private laboratories to determine cost of chemical analysis in wastewater. • Apex Laboratories, LLC in Tigard, OR • Pacific Agricultural Laboratory in Sherwood, OR • Eurofins Calscience, LLC in Irvine, CA	Oregon DEQ 700 NE Multnomah Street, Suite 600 Portland, OR 97232-4100
Email Communication and Attached Comment on: • Draft Fiscal and Economic Impact Statement, From the Cow Creek Band of Umpqua Tribe of Indians	Oregon DEQ 700 NE Multnomah Street, Suite 600 Portland, OR 97232-4100
Email Communication and Attached Comment on: • Draft Fiscal and Economic Impact Statement, • Water Quality Standards Aquatic Life Toxics Criteria Update 2024: Issue Paper, Discussion Draft From the Oregon Association of Clean Water Agencies (OR-ACWA)	Oregon DEQ 700 NE Multnomah Street, Suite 600 Portland, OR 97232-4100
Email Communication and Attached Comment (two letters) on: • Draft Fiscal and Economic Impact Statement, From the Pacific Coast Federation of Fishermen's Associations.	Oregon DEQ 700 NE Multnomah Street, Suite 600 Portland, OR 97232-4100
Email Communication containing information for the Draft Fiscal and	Oregon DEQ 700 NE Multnomah Street,

Economic Impact Statement from Oregon Department of Transportation	Suite 600 Portland, OR 97232-4100

Advisory committee fiscal review

DEQ appointed an advisory committee for the aquatic life toxics rulemaking. Meeting summaries are available on DEQ's website. A summary of rulemaking advisory committee comments can also be found in *Water Quality Standards Aquatic Life Toxics Criteria Update 2024: Issue Paper.*

As ORS 183.33 requires, DEQ asked for the committee's recommendations on:

- Whether the proposed rules would have a fiscal impact,
- The extent of the impact, and
- Whether the proposed rules would have a significant adverse impact on small businesses; if so, then how DEQ can comply with ORS 183.540 reduce that impact.

The committee reviewed the draft fiscal and economic impact statement and its findings are summarized in the approved meeting summary dated Nov. 13, 2023.

The committee reviewed the draft fiscal and economic impact statement and provided comment to DEQ via online Zoom meeting. DEQ also asked the committee to provide written comments to DEQ regarding the draft fiscal and economic impact statement and whether the rules would have a significant fiscal impact on small businesses. During the Zoom meeting, committee members offered the following comments:

- Members of the committee agreed that the proposed new or revised criteria represented a minor change to Oregon's existing water quality standards.
- Members of the committee highlighted an environmental and regulatory benefit of adopting the proposed criteria.
- The economic value of the benefits of the proposed criteria were underrepresented by DEQ in the fiscal and economic impact statement.
- Meeting the conditions of MS4 general and/or individual permits affected by these criteria updates could require more resource investment in monitoring, investigation, and action address the exceedances (education/outreach, source control, or other best management practices) than DEQ acknowledged in the first draft.
- Whether the effects of climate change might impact the fiscal and economic impact statement.

In written comments, the Oregon Association of Clean Water Agencies (OR-ACWA) suggested amendments to DEQ's assessment of impacts to individual and domestic discharges and provided additional language for stormwater and municipal storm sewer permittee impacts. OR-ACWA also reviewed *Water Quality Standards Aquatic Life Toxics Criteria Update 2024: Issue Paper, Discussion Draft* and highlighted data gaps, particularly for stormwater and municipal storm sewers.

The Pacific Coast Federation of Fisherman's Associations (PCFFA) provided written comment highlighting the net economic benefits (both monetizable and non-monetizable) of water quality protection through the lens of salmon restoration from adopting the proposed criteria into rule. PCFFA generally agreed with DEQ's assessment of the cost of compliance for the proposed criteria. However, PCFFA indicated that by primarily focusing on the cost of compliance of the rule, DEQ over-emphasizes monetary costs, and under-values
or ignores both monetary benefits as well as social benefits.

The Cow Creek Band of Umpqua Tribe of Indians provided written comment that adopting the proposed criteria would protect aquatic life natural and cultural resources to the benefit of the Tribe.

The Oregon Department of Transportation provided a written summary of the potential effects and considerations that would need to be made to assess whether the proposed aquatic life criteria would have a fiscal impact on state agencies.

The committee did not suggest or provide evidence that there would be a significant adverse impact on small businesses in Oregon.

Housing cost

As ORS 183.534 requires, DEQ evaluated whether the proposed rules would have an effect on the development cost of a 6,000-square-foot parcel and construction of a 1,200-square-foot detached, single-family dwelling on that parcel. DEQ determined the proposed rules would have no effect on the development costs because the aquatic life criteria proposed for adoption are not likely to be used or discharged during housing construction and will not have an expected impact on general permit holders for construction activities (1200-C).

Racial Equity

ORS 183.335(2)(a)(F) requires state agencies to provide a statement identifying how adoption of this rule will affect racial equity in this state.

Applying and implementing the proposed aquatic life criteria statewide will provide additional protection for fish and aquatic life and regulatory pollution control mechanisms in Oregon under the Clean Water Act. Given that racial minority groups have been historically marginalized and relegated to live and work in the most polluted areas, near industrial discharges or areas with significant use of pesticides, this rulemaking will take a step to improve racial equity in Oregon by providing Clean Water Act protections that reduce pollution in these areas.

By adopting the proposed criteria, fish, shellfish, and other aquatic species will receive increased protection, which is expected to increase the health of fisheries. This may in turn provide benefits to communities that rely on healthy fish populations and ecosystems culturally and for food.

Environmental Justice Considerations

Environmental justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, culture, education or income with respect to the development, implementation and enforcement of environmental laws, regulations and policies. DEQ is committed to incorporating environmental justice best practices into its programs and decision-making, to ensure all people in Oregon have equitable environmental and public health protections.

ORS 182.545 requires natural resource agencies to consider the effects of their actions on environmental justice issues. DEQ considered these effects by:

- Inviting community groups with different cultural, economic, or recreational interests in fish and aquatic life resources to participate in the rulemaking advisory committee and provide input on economic impact and rule development.
- Scheduling a public hearing in a virtual setting so that members of the public from across the state may attend and give input.

The proposed rule amendments apply statewide and will provide increased protection for aquatic life in Oregon. Protecting fish and aquatic life beneficial uses will contribute to healthy aquatic ecosystems and fisheries in Oregon. Adopting the proposed criteria would protect aquatic life natural and cultural resources to the benefit of the Tribes.

Land use

Land-use considerations

In adopting new or amended rules, ORS 197.180 and OAR 340-018-0070 require DEQ to determine whether the proposed rules significantly affect land use. If so, DEQ must explain how the proposed rules comply with state wide land-use planning goals and local acknowledged comprehensive plans.

Under OAR 660-030-0005 and OAR 340 Division 18, DEQ considers that rules affect land use if:

- The statewide land use planning goals specifically refer to the rule or program, or
- The rule or program is reasonably expected to have significant effects on:
- Resources, objects, or areas identified in the statewide planning goals, or
- Present or future land uses identified in acknowledge comprehensive plans

DEQ determined whether the proposed rules involve programs or actions that affect land use by reviewing its Statewide Agency Coordination plan. The plan describes the programs that DEQ determined significantly affect land use. DEQ considers that its programs specifically relate to the following statewide goals:

Goal	Title
5	Natural Resources, Scenic and Historic Areas, and Open Spaces
6	Air, Water and Land Resources Quality
11	Public Facilities and Services
16	Estuarine Resources
19	Ocean Resources

Statewide goals also specifically reference the following DEQ programs:

- Nonpoint source discharge water quality program – Goal 16
- Water quality and sewage disposal systems – Goal 16
- Water quality permits and oil spill regulations – Goal 19

Determination

DEQ determined that these proposed rules do not affect land use under OAR 340-018-0030 or DEQ's State Agency Coordination Program.

The proposed rule amendments may contribute to increased ecological health for aquatic communities, which supports Oregon's land-use planning goals.

EQC Prior Involvement

DEQ shared information about this rulemaking with the EQC through a director's report at their meeting in September 2023 and again in January 2024.

Advisory Committee

Background
DEQ convened the Aquatic Life Toxics Criteria Rulemaking Advisory Committee, which met twice between September and November 2023. The committee included representatives from EPA, National Marine Fisheries Service, U.S. Fish and Wildlife Service, Oregon Department of Fish and Wildlife, Oregon Department of Transportation, Oregon Department of Forestry, Oregon Department of Agriculture, Oregon tribes, fishing and sport fishing industries, business and industry, agriculture, local governments, and environmental organizations. The committee's web page is located at: Aquatic Life Toxics Criteria 2024 Rulemaking.

The committee members were:

Aquatic Life Toxics Criteria Rulemaking Advisory Committee	
Name	**Representing**
Emily Bowes	Rogue Riverkeeper
Michael Campbell	Stoel Rives LLP
Catherine Corbett	Lower Columbia Estuary Partnership
Mike Eliason	Oregon Forest & Industries Council (OFIC)
Raj Kapur Alternate: Julia Crown	Oregon Association of Clean Water Agencies (OR-ACWA)
Hannah LaGassey Alternate: Marnie Keller	Cow Creek Band of the Umpqua Tribe of Indians
Sharla Moffett	Oregon Business & Industry
Lauren Poor	Oregon Farm Bureau
Glen Spain	Pacific Coast Federation of Fishermen's Associations (PCFFA)
Becky Anthony	Oregon Department of Fish and Wildlife
Jeremy Buck	U.S. Fish and Wildlife Service
Cory Engel	Oregon Department of Transportation
Michelle Maier	U.S. Environmental Protection Agency
Rebecca McCoun	Oregon Department of Forestry
Kathryn Rifenburg Alternate: Gilbert Uribe	Oregon Department of Agriculture
Greg Sieglitz	NOAA – National Marine Fisheries Service

Meeting notifications

To notify people about the advisory committee's activities, DEQ:

- Sent GovDelivery bulletins, a free e-mail subscription service, to the following lists:
  - Rulemaking
  - DEQ Public Notices
  - Water Quality Standards
- Posted meeting information and materials on the web page for this rulemaking
- Added advisory committee announcements to DEQ's calendar of public meetings at DEQ Calendar.

Committee discussions

In addition to the recommendations described under the Statement of Fiscal and Economic Impact section above, the committee was informed about the scientific and policy basis for DEQ's proposal to adopt new or updated aquatic life criteria for six toxic chemicals. At the first meeting, DEQ reviewed the committee charter, the policy objective for the rulemaking, and general background information on water quality standards and criteria. DEQ presented the results of a comprehensive review of Oregon's aquatic life criteria and the list of proposed aquatic life criteria for adoption as well as justification for DEQ's choice not to update some criteria at this time. The committee discussed the basis for the proposed aquatic life criteria, potential sources of additional information that might be useful to DEQ's analysis, and the reasons behind DEQ's decision not to update select criteria at this time. At the end of the first meeting, DEQ asked the committee to provide any known information that may be used in drafting the fiscal and economic impact statement. DEQ provided committee members with background information drafts (issue paper, fact sheet), draft rule language, and a draft fiscal and economic impact statement for committee review before the next meeting.

At the second meeting, DEQ presented the first draft of the red-lined rule language for the proposed amendments and described the intent of detailed footnotes. The RAC generally supported adoption of the federal criteria for the proposed toxics substances into Oregon's administrative rules. The committee also discussed the implications of removing the non-regulatory guidance values for toxic pollutants from rule language, and generally supported the removal of those values from rule language. DEQ also presented and summarized the major points of the draft fiscal and economic impact statement. The committee discussed the regulatory benefit of adopting numeric criteria values and generally agreed that the proposed rule amendments represented a minor change to Oregon water quality standards but noted that the potential economic benefit was not adequately represented in the draft fiscal and economic impact statement. Further, the committee recommended additional clarification, consistency, and data be incorporated regarding the cost of compliance for some entities (i.e. MS4 permittees). More detailed information can be found in the Statement of Fiscal and Economic Impact section.

Public Engagement

Public notice

DEQ provided notice of the proposed rulemaking and rulemaking hearing by:

- On March 15, 2024 Filing notice with the Oregon Secretary of State for publication in the April 1, 2024 Oregon Bulletin;
- Notifying the EPA by email;
- Posting the Notice, Invitation to Comment and Draft Rules on the web page for this rulemaking, located at: Aquatic Life Toxics Criteria 2024 Rulemaking;
- Emailing approximately 23,933 interested parties on the following DEQ lists through GovDelivery:
    - Rulemaking
    - DEQ Public Notices
    - Water Quality Standards
- Emailing the following key legislators required under ORS 183.335:
    - Senator Jeff Golden, Chair, Senate Committee on Natural Resources
    - Senator Fred Girod, Vice-Chair, Senate Committee on Natural Resources
    - Representative Ken Helm, Chair, House Committee on Agriculture, Land Use, Natural Resources and Water
    - Representative Mark Owens, Vice-Chair, House Committee on Agriculture, Land Use, Natural Resources and Water
    - Representative Annessa Hartman, Vice-Chair, House Committee on Agriculture, Land Use, Natural Resources and Water
    - Representative Pam Marsh, Chair, House Committee on Climate, Energy and Environment
    - Representative Emerson Levy, Vice-Chair, House Committee on Climate, Energy and Environment
    - Representative Bobby Levy, Vice-Chair, House Committee on Climate, Energy and Environment
- Emailing advisory committee members,
- Posting on the DEQ event calendar: DEQ Calendar

How to comment on this rulemaking proposal

DEQ is asking for public comment on the proposed rules. Anyone can submit comments and questions about this rulemaking. DEQ will accept comments by email, postal mail or verbally at the public hearing.

- **Email:** Send comments by email to: Aquatic.Life2024@DEQ.oregon.gov
- **Postal mail:** Oregon DEQ, Attn: Mailea Miller-Pierce/Water Quality Standards, 700 NE Multnomah Street, Suite 600, Portland, Oregon 97232-4100
- **At public hearing:** 4 p.m., Tuesday, April 23, 2024 (see below)

Public Hearings

DEQ plans to hold one public hearing. Anyone can attend a hearing by webinar or teleconference.

Date: Tuesday, April 23, 2024
Start time: 4 p.m.

Join via Zoom
(**NOTE:** If this link does not work, you can type in this web address: https://us02web.zoom.us/j/83557593542)

Join by phone:
Teleconference phone number: 833 928 4609 US Toll-free
Meeting ID: 835 5759 3542

Instructions on how to join webinar or teleconference: Instructions

Comment deadline

DEQ will only consider comments on the proposed rules that DEQ receives by **5 p.m., on Friday, May 3, 2024**.

Note for public university students:

ORS 192.345(29) allows Oregon public university and OHSU students to protect their university email addresses from disclosure under Oregon's public records law. If you are an Oregon public university or OHSU student, notify DEQ that you wish to keep your email address confidential.

Accessibility Information

Español | 한국어 | 繁體中文 | Русский | Tiếng Việt | العربية

Contact: 800-452-4011 | TTY: 711 | deqinfo@deq.state.or.us

DEQ does not discriminate on the basis of race, color, national origin, disability, age or sex in administration of its programs or activities.

Visit DEQ's Civil Rights and Environmental Justice page.

Draft Rules – Edits Highlighted

Key to Identifying Changed Text:

~~Deleted Text~~
New/inserted text

Division 41
WATER QUALITY STANDARDS: BENEFICIAL USES, POLICIES, AND CRITERIA FOR OREGON

340-041-0033
Toxic Substances

(1) Toxic Substances Narrative. Toxic substances may not be introduced above natural background levels in waters of the state in amounts, concentrations, or combinations that may be harmful, may chemically change to harmful forms in the environment, or may accumulate in sediments or bioaccumulate in aquatic life or wildlife to levels that adversely affect public health, safety, or welfare or aquatic life, wildlife or other designated beneficial uses.

(2) Aquatic Life Numeric Criteria. Levels of toxic substances in waters of the state may not exceed the applicable aquatic life criteria as defined in Table 30 under OAR 340-041-8033.

(3) Human Health Numeric Criteria. The criteria for waters of the state listed in Table 40 under OAR 340-041-8033 are established to protect Oregonians from potential adverse health effects associated with long-term exposure to toxic substances associated with consumption of fish, shellfish and water.

(4) To establish permit or other regulatory limits for toxic substances without criteria in Table 30 under OAR 340-041-8033 or Table 40 under 340-041-8033, DEQ may use ~~the guidance values in Table 31 under 340-041-8033,~~ public health advisories~~,~~ and published scientific literature. DEQ may also require or conduct bio-assessment studies to monitor the toxicity to aquatic life of complex effluents, other suspected discharges or chemical substances without numeric criteria.

(5) Establishing Site-Specific Background Pollutant Criteria: This provision is a performance-based water quality standard that results in site-specific human health water quality criteria under the conditions and procedures specified in this rule section. It addresses existing permitted discharges of a pollutant removed from the same body of water. For waterbodies where a discharge does not increase the pollutant's mass and does not increase the pollutant concentration by more than 3 percent, and where the water body meets a pollutant concentration associated with a risk level of 1 x 10-4, DEQ concludes that the pollutant concentration continues to protect human health.

(a) Definitions: As used in this section:

(A) “Background pollutant concentration” means the ambient water body concentration immediately upstream of the discharge, regardless of whether those pollutants are natural or result from upstream human activity.

(B) An “intake pollutant” is the amount of a pollutant present in waters of the state (including groundwater) as provided in subsection (C), below, at the time it is withdrawn from such waters by the discharger or other facility supplying the discharger with intake water.

(C) “Same body of water”: An intake pollutant is considered to be from the “same body of water” as the discharge if DEQ finds that the intake pollutant would have reached the vicinity of the outfall point in the receiving water within a reasonable period had the permittee not removed it. To make this finding, DEQ requires information showing that:

(i) The background concentration of the pollutant in the receiving water (excluding any amount of the pollutant in the facility's discharge) is similar to that in the intake water; and,

(ii) There is a direct hydrological connection between the intake and discharge points.

(I) DEQ may also consider other site-specific factors relevant to the transport and fate of the pollutant to make the finding in a particular case that a pollutant would or would not have reached the vicinity of the outfall point in the receiving water within a reasonable period had the permittee not removed it.

(II) An intake pollutant from groundwater may be considered to be from the “same body of water” if DEQ determines that the pollutant would have reached the vicinity of the outfall point in the receiving water within a reasonable period had the permittee not removed it. A pollutant is not from the same body of water if the groundwater contains the pollutant partially or entirely due to past or present human activity, such as industrial, commercial, or municipal operations, disposal actions, or treatment processes.

(iii) Water quality characteristics (e.g., temperature, pH, hardness) are similar in the intake and receiving waters.

(b) Applicability

(A) DEQ may establish site-specific criteria under this rule section only for carcinogenic pollutants.

(B) Site-specific criteria established under this rule section apply in the vicinity of the discharge for purposes of establishing permit limits for the specified permittee.

(C) The underlying waterbody criteria continue to apply for all other Clean Water Act programs.

(D) The site-specific background pollutant criterion will be effective when DEQ issues the permit for the specified permittee.

(E) DEQ will reevaluate any site-specific criteria developed under this procedure upon permit renewal.

(c) DEQ may establish a site-specific background pollutant criterion when all of the following conditions are met:

(A) The discharger has a currently effective NPDES permit;

(B) The mass of the pollutant discharged to the receiving waterbody does not exceed the mass of the intake pollutant from the same body of water, as defined in section (5)(a)(C) above, and therefore does not increase the total mass load of the pollutant in the receiving water body;

(C) DEQ has not assigned the discharger a TMDL wasteload allocation for the pollutant in question;

(D) The permittee uses any feasible pollutant reduction measures available and known to minimize the pollutant concentration in their discharge;

(E) The pollutant discharge has not been chemically or physically altered in a manner that causes adverse water quality impacts that would not occur if the intake pollutants were left in-stream; and,

(F) The timing and location of the pollutant discharge would not cause adverse water quality impacts that would not occur if the intake pollutant were left in-stream.

(d) The site-specific background pollutant criterion must be the most conservative of the following four values. Section (5)(e) of this rule describes the procedures for deriving these values.

(A) The projected in-stream pollutant concentration resulting from the current discharge concentration and any feasible pollutant reduction measures under (c)(D) above, after mixing with the receiving stream.

(B) The projected in-stream pollutant concentration resulting from the portion of the current discharge concentration associated with the intake pollutant mass after mixing with the receiving stream. This analysis ensures that there will be no increase in the mass of the intake pollutant in the receiving water body as required by condition (c)(B) above.

(C) The projected in-stream pollutant concentration associated with a 3 percent increase above the background pollutant concentration as calculated:

(i) For the main stem Willamette and Columbia Rivers, using 25 percent of the harmonic mean flow of the waterbody.

(ii) For all other waters, using 100 percent of the harmonic mean flow or similar critical flow value of the waterbody.

(D) A criterion concentration value representing a human health risk level of 1 x 10-4. DEQ calculates this value using EPA's human health criteria derivation equation for carcinogens (EPA 2000), a risk level of 1 x 10-4, and the same values for the remaining calculation variables that were used to derive the underlying human health criterion.

(e) Procedure to derive a site-specific human health water quality criterion to address a background pollutant:

(A) DEQ will develop a flow-weighted characterization of the relevant flows and pollutant concentrations of the receiving waterbody, effluent and all facility intake pollutant sources to determine the fate and transport of the pollutant mass.

(i) The pollutant mass in the effluent discharged to a receiving waterbody may not exceed the mass of the intake pollutant from the same body of water.

(ii) Where a facility discharges intake pollutants from multiple sources that originate from the receiving waterbody and from other waterbodies, DEQ will calculate the flow-weighted amount of each source of the pollutant in the characterization.

(iii) Where a municipal water supply system provides intake water for a facility and the supplier provides treatment of the raw water that removes an intake water pollutant, the concentration and mass of the intake water pollutant must be determined at the point where the water enters the water supplier's distribution system.

(B) Using the flow weighted characterization developed in section (5)(e)(A), DEQ will calculate the in-stream pollutant concentration following mixing of the discharge into the receiving water. DEQ will use the resultant concentration to determine the conditions in section (5)(d)(A) and (B).

(C) Using the flow-weighted characterization, DEQ will calculate the in-stream pollutant concentration based on an increase of 3 percent above background pollutant concentration. DEQ will use the resultant concentration to determine the condition in Section (5)(d)(C).

(i) For the main stem Willamette and Columbia Rivers, DEQ will use 25 percent of the harmonic mean flow of the waterbody.

(ii) For all other waters, DEQ will use 100 percent of the harmonic mean flow or similar critical flow value of the waterbody.

(D) DEQ will select the most conservative of the following values as the site-specific water quality criterion.

(i) The projected in-stream pollutant concentration described in section (5)(e)(B);

(ii) The in-stream pollutant concentration based on an increase of 3 percent above background described in section (5)(e)(C); or

(iii) A water quality criterion based on a risk level of 1 x 10-4.

(f) Calculation of water quality based effluent limits based on a site-specific background pollutant criterion:

(A) For discharges to receiving waters with a site-specific background pollutant criterion, DEQ will use the site-specific criterion in the calculation of a numeric water quality based effluent limit.

(B) DEQ will compare the calculated water quality based effluent limits to any applicable aquatic toxicity or technology based effluent limits and select the most conservative for inclusion in the permit conditions.

(g) In addition to the water quality based effluent limits described in section (5)(f), DEQ will calculate a mass-based limit where necessary to ensure that the condition described in section (5)(c)(B) is met. Where mass-based limits are included, the permit will specify how DEQ will assess compliance with mass-based effluent limitations.

(h) The permit shall include a provision requiring DEQ to consider the re-opening of the permit and re-evaluation of the site-specific background pollutant criterion if new information shows the discharger no longer meets the conditions described in subsections (5)(c) and (e).

(i) Public Notification Requirements.

(A) If DEQ proposes to grant a site-specific background pollutant criterion, it must provide public notice of the proposal and hold a public hearing. The public notice may be included in the public notification of a draft NPDES permit or other draft regulatory decision that would rely on the criterion and will also be published on DEQ's water quality standards website;

(B) DEQ will publish a list of all site-specific background pollutant criteria approved according to this rule. DEQ will add the criterion to this list within 30 days of its effective date. The list will identify the:

(i) Permittee;

(ii) Site-specific background pollutant criterion and the associated risk level;

(iii) Waterbody to which the criterion applies;

(iv) Allowable pollutant effluent limit; and,

(v) How to obtain additional information about the criterion.

(6) Arsenic Reduction Policy: The inorganic arsenic criterion for the protection of human health from the combined consumption of organisms and drinking water is 2.1 micrograms per liter. While this criterion is protective of human health and more stringent than the federal maximum

contaminant level (MCL) for arsenic in drinking water, which is 10 micrograms per liter, it is based on a higher risk level than EQC used to establish other human health criteria. This higher risk level recognizes that much of the risk is due to naturally high levels of inorganic arsenic in Oregon's waterbodies. In order to maintain the lowest human health risk from inorganic arsenic in drinking water, EQC determined that it is appropriate to adopt the following policy to limit the human contribution to that risk.

(a) It is EQC policy to reduce the addition of inorganic arsenic from new or existing anthropogenic sources to waters of the state within a surface water drinking water protection area to the maximum amount feasible. The requirements of this rule section (OAR 340-041-0033(6)) apply to sources that discharge to surface waters of the state with an ambient inorganic arsenic concentration equal to or lower than the applicable numeric inorganic arsenic criteria for the protection of human health.

(b) Definitions. As used in this section:

(A) "Add inorganic arsenic" means to discharge a net mass of inorganic arsenic from a point source (the mass of inorganic arsenic discharged minus the mass of inorganic arsenic taken into the facility from a surface water source).

(B) A "surface water drinking water protection area," means an area delineated as such by DEQ under the source water assessment program of the federal Safe Drinking Water Act, 42 U.S.C. § 300j 13. DEQ delineates these areas to protect public or community drinking water supplies that use surface water sources. These delineations are on DEQ's drinking water program Web page.

(C) "Potential to significantly increase inorganic arsenic concentrations in the public drinking water supply source water" means:

(i) A discharge will increase the concentration of inorganic arsenic in the receiving water by 10 percent or more after mixing with the harmonic mean flow of the receiving water; or

(ii) As an alternative, if sufficient data are available, the discharge will increase the concentration of inorganic arsenic in the surface water intake water of a public water system by 0.021 micrograms per liter or more based on a mass balance calculation.

(c) Following the effective date of this rule, applications for an individual NPDES permit or permit renewal received from industrial dischargers located in a surface water drinking water protection area and identified by DEQ as likely to add inorganic arsenic to the receiving water must include sufficient data to enable DEQ to determine whether:

(A) The discharge adds inorganic arsenic; and,

(B) The discharge has the potential to significantly increase inorganic arsenic concentrations in the public drinking water supply source water.

(d) Where DEQ determines that both conditions in subsection (c) of this section (6) are true, the industrial discharger must develop an inorganic arsenic reduction plan and propose all feasible measures to reduce its inorganic arsenic loading to the receiving water. The proposed plan, including proposed measures, monitoring and reporting requirements, and a schedule for those actions, will be described in the fact sheet and incorporated into the source's NPDES permit after public comment and DEQ review and approval. In developing the plan, the source must:

(A) Identify how much it can minimize its inorganic arsenic discharge through pollution prevention measures, process changes, wastewater treatment, alternative water supply for groundwater users, or other possible pollution prevention and control measures;

(B) Evaluate the costs, feasibility and environmental impacts of the potential inorganic arsenic reduction and control measures;

(C) Estimate the predicted reduction in inorganic arsenic and the reduced human health risk expected to result from the control measures;

(D) Propose specific inorganic arsenic reduction or control measures, if feasible, and an implementation schedule; and,

(E) Propose monitoring and reporting requirements to document progress in plan implementation and the inorganic arsenic load reductions.

(e) In order to implement this section, DEQ will develop the following information and guidance within 120 days of the effective date of this rule and periodically update it as warranted by new information:

(A) A list of industrial sources or source categories, including industrial stormwater and sources covered by general permits likely to add inorganic arsenic to surface waters of the state. For industrial sources or source categories permitted under a general permit that have been identified by DEQ as likely sources of inorganic arsenic, DEQ will evaluate options for reducing inorganic arsenic during permit renewal or evaluation of Stormwater Pollution Control Plans.

(B) Quantitation limits for monitoring inorganic arsenic concentrations.

(C) Information and guidance to assist sources in estimating, according to subsection (d)(C) of this section, the reduced human health risk expected to result from inorganic arsenic control measures based on the most current EPA risk assessment.

(f) It is the policy of EQC that landowners engaged in agricultural or development practices on land where pesticides, fertilizers, or soil amendments containing arsenic are currently being or have previously been applied, implement conservation practices to minimize the erosion and runoff of inorganic arsenic to waters of the state or to a location where such material could readily migrate into waters of the state.

NOTE: Tables 30~~,~~ ~~31~~ and 40 are found under OAR 340-041-8033.

Statutory/Other Authority: ORS 468.020, 468B.030, 468B.035 & 468B.048
Statutes/Other Implemented: ORS 468B.030, 468B.035 & 468B.048
History:
DEQ 11-2016, f. & cert. ef. 11-2-16
DEQ 1-2015, f. & cert. ef. 1-7-15
DEQ 17-2013, f. 12-23-13, cert. ef. 4-18-14
DEQ 10-2011, f. & cert. ef. 7-13-11
DEQ 8-2011, f. & cert. ef. 6-30-11
DEQ 17-2010, f. & cert. ef. 12-21-10
DEQ 3-2004, f. & cert. ef. 5-28-04
DEQ 17-2003, f. & cert. ef. 12-9-03

Division 41
WATER QUALITY STANDARDS: BENEFICIAL USES, POLICIES, AND CRITERIA FOR OREGON

340-041-8033
Division 41 Tables and Figures

(1) Table 30: Aquatic Life Water Quality Criteria for Toxic Pollutants. This table, referenced in OAR 340-041-0033, contains information about the applicability and content of the criteria contained in the table.

~~(2) Table 31: Aquatic Life Water Quality Guidance Values for Toxic Pollutants. This table, referenced in OAR 340-041-0033, contains information about the applicability and content of the criteria contained in the table.~~

(~~3~~2) Table 40: Human Health Water Quality Criteria for Toxic Pollutants. This table, referenced in OAR 340-041-0033, contains information about the applicability and content of the criteria contained in the table.

[ED. NOTE: To view attachments referenced in rule text, click here for PDF copy.]
Statutory/Other Authority: ORS 468.020, 468B.030, 468B.035 & 468B.048Statutes/Other
Implemented: ORS 468B.030, 468B.035 & 468B.048
History:
DEQ 13-2019, amend filed 05/16/2019, effective 05/16/2019
DEQ 13-2017, minor correction filed 10/30/2017, effective 10/30/2017
DEQ 11-2016, f. & cert. ef. 11-2-16
DEQ 1-2015, f. & cert. ef. 1-7-15

State of Oregon Department of Environmental Quality

OAR 340-041-8033

Table 30

Aquatic Life Water Quality Criteria for Toxic Pollutants

The concentration for each compound listed in Table 30 is a criterion established for waters of the state in order to protect aquatic life. The aquatic life criteria apply to waterbodies where the protection of fish and aquatic life is a designated use. All values are expressed as micrograms per liter (µg/L). Compounds are listed in alphabetical order with the corresponding information: the Chemical Abstract Service (CAS) number, whether there is a human health criterion for the pollutant (i.e. "y"= yes, "n" = no), and the associated aquatic life freshwater and saltwater acute and chronic criteria. *Italicized* pollutants are not identified as priority pollutants by EPA. Dashes in the table column indicate that there is no aquatic life criterion.

Unless otherwise noted in the table below, the acute criterion is the Criterion Maximum Concentration (CMC) applied as a one-hour average concentration, and the chronic criterion is the Criterion Continuous Concentration (CCC) applied as a 96-hour (4 days) average concentration. The CMC and CCC criteria may not be exceeded more than once every three years. Footnote A, associated with eleven pesticide pollutants in Table 30, describes the exception to the frequency and duration of the toxics criteria stated in this paragraph.

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Table 30
Aquatic Life Water Quality Criteria for Toxic Pollutants

No.	Pollutant	CAS Number	Human Health Criterion	Freshwater (µg/L)		Saltwater (µg/L)	
				Acute Criterion (CMC)	Chronic Criterion (CCC)	Acute Criterion (CMC)	Chronic Criterion (CCC)
1	Acrolein	107028	y	3.0	3.0	--	--
NOTE: These acrolein criteria are not applicable for Clean Water Act purposes until approved by EPA.							
2~~1~~	Aldrin	309002	y	3 [A]	--	1.3 [A]	--
[A] *See expanded endnote A at bottom of Table 30 for alternate frequency and duration of this criterion.*							
3~~2~~	*Alkalinity*		n	--	20,000 [B]	--	--

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Table 30
Aquatic Life Water Quality Criteria for Toxic Pollutants

No.	Pollutant	CAS Number	Human Health Criterion	Freshwater (µg/L)		Saltwater (µg/L)	
				Acute Criterion (CMC)	Chronic Criterion (CCC)	Acute Criterion (CMC)	Chronic Criterion (CCC)
[B] *Criterion shown is the minimum (i.e. CCC in water may not be below this value in order to protect aquatic life).*							
4	*Aluminum*	7429905	n	*See* **O, P**	*See* **O, P**	--	--
[O] The freshwater criterion for aluminum is a function of the pH, dissolved organic carbon, and total hardness in the water column. Acute (CMC) and chronic (CCC) freshwater aluminum criteria values shall be calculated using the 2018 Aluminum Criteria Calculator (Aluminum Criteria Calculator V.2.0.xlsx), or a calculator in R or other software package using the same 1985 Guidelines calculation approach and underlying model equations as in the Aluminum Criteria Calculator V.2.0.xlsx, as defined in EPA's Final Aquatic Life Ambient Water Quality Criteria for Aluminum (EPA 822-R-18-001). See also endnote O for procedures and information. *[P] Oregon will use analytical methods that measure the bioavailable fraction of aluminum unless total recoverable aluminum measurements are required by Federal regulations.* *Note: These aluminum criteria are not applicable for CWA purposes until approved by EPA. The currently applicable federally promulgated criteria may be found at 40 CFR 131.47.*							
53	*Ammonia*	7664417	n	*The ammonia criteria are pH and temperature dependent — See ammonia criteria Tables 30(a)-(c) at end of Table 30.*[M]	*The ammonia criteria are pH, temperature and salinity dependent. Values for saltwater criteria (total ammonia) can be calculated from the tables specified in Ambient Water Quality Criteria for Ammonia (Saltwater)—1989 (EPA 440/5-88-004)* *See DEQ's calculator for calculating saltwater ammonia criteria at: http://www.deq.state.or.us/wq/standards/toxics.htm*		

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Table 30
Aquatic Life Water Quality Criteria for Toxic Pollutants

No.	Pollutant	CAS Number	Human Health Criterion	Freshwater (µg/L)		Saltwater (µg/L)	
				Acute Criterion (CMC)	Chronic Criterion (CCC)	Acute Criterion (CMC)	Chronic Criterion (CCC)
[M] *The acute criteria in Table 30(a) apply in waterbodies where salmonids are a designated use in OAR 340-041-0101 through OAR 340-041-0340. The acute criteria in Table 30(b) apply in waterbodies where salmonids are not a designated use. The chronic criteria in Table 30(c) apply where fish and aquatic life is a designated use. It is not necessary to account for the presence or absence of salmonids or the presence of any early life stage of fish for the chronic criteria. Refer to DEQ's beneficial use website at: http://www.deq.state.or.us/wq/standards/uses.htm for additional information on salmonid beneficial use designations, including tables and maps.*							
6~~4~~	Arsenic	7440382	y	340 [C, D]	150 [C, D]	69 [C, D]	36 [C, D]
[C] *Criterion is expressed in terms of "dissolved" concentrations in the water column.* [D] *Criterion is applied as total inorganic arsenic (i.e. arsenic (III) + arsenic (V)).*							
7~~5~~	BHC Gamma (Lindane)	58899	y	0.95	0.08 [A]	0.16 [A]	--
[A] *See expanded endnote A at bottom of Table 30 for alternate frequency and duration of this criterion.*							
8~~6~~	Cadmium	7440439	n	*See* ~~E~~ C, F	*See* **C, F**	~~40~~ 33 [C]	~~8.8~~ 7.9 [C]
[C] *Criterion is expressed in terms of "dissolved" concentrations in the water column.* ~~[E] *The freshwater criterion for this metal is expressed as "total recoverable" and is a function of hardness (mg/L) in the water column. To calculate the criterion, use formula under expanded endnote E at bottom of Table 30.*~~ [F] *The freshwater criterion for this metal is expressed as a function of hardness (mg/L) in the water column. To calculate the criterion, use the formula under expanded endnote F at bottom of Table 30.* *NOTE: The federally promulgated freshwater acute cadmium criterion in 40 CFR 131.46 remains applicable for CWA purposes until EPA approves the freshwater acute cadmium criterion specified in Table 30 Endnotes C and F. The following saltwater cadmium criteria remain applicable until EPA approves the revised criteria in Table 30: the cadmium acute (CMC) is 40 µg/L and the chronic (CCC) is 8.8 µg/L, both expressed in terms of "dissolved" concentrations in the water column.*							
9	Carbaryl	63252	n	2.1	2.1	1.6	--

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Table 30
Aquatic Life Water Quality Criteria for Toxic Pollutants

No.	Pollutant	CAS Number	Human Health Criterion	Freshwater (µg/L)		Saltwater (µg/L)	
				Acute Criterion (CMC)	Chronic Criterion (CCC)	Acute Criterion (CMC)	Chronic Criterion (CCC)
NOTE: These carbaryl criteria are not applicable for Clean Water Act purposes until approved by EPA.							
10~~7~~	Chlordane	57749	y	2.4 [A]	0.0043 [A]	0.09 [A]	0.004 [A]
[A] *See expanded endnote A at bottom of Table 30 for alternate frequency and duration of this criterion.*							
11~~8~~	*Chloride*	16887006	n	860,000	230,000	--	--
12~~9~~	*Chlorine*	7782505	n	19	11	13	7.5
13~~1~~ ~~0~~	*Chlorpyrifos*	2921882	n	0.083	0.041	0.011	0.0056
14~~1~~ ~~1~~	Chromium III	16065831	n	*See* **C, F**	*See* **C, F**	--	--
[C] *Criterion is expressed in terms of "dissolved" concentrations in the water column.* [F] *The freshwater criterion for this metal is expressed as a function of hardness (mg/L) in the water column. To calculate the criterion, use formula under expanded endnote F at bottom of Table 30.*							
15~~1~~ ~~2~~	Chromium VI	18540299	n	16 [C]	11 [C]	1100[C]	50[C]
[C] *Criterion is expressed in terms of "dissolved" concentrations in the water column.*							
16~~1~~ ~~3~~	Copper	7440508	y	*See* **C, N**	*See* **C, N**	4.8 [C]	3.1 [C]

[C] *Criterion is expressed in terms of "dissolved" concentrations in the water column.*

[N] *The freshwater criterion for copper is a function of the concentration of ions, alkalinity, organic carbon, pH and temperature in the water column. To calculate the criterion, use the Biotic Ligand Model referenced in endnote N at the bottom of Table 30. The acute copper criterion (CMC) is applied as a one-hour average concentration. The chronic criterion (CCC) is applied as a 96-hour (4 days) average concentration. See endnote N also for procedures and information.*

~~*[**Note**: The Environmental Quality Commission adopted these revised copper criteria on 11/02/2016. However, the revised criteria become effective for federal Clean Water Act purposes upon approval by the U.S. Environmental Protection Agency.]*~~

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Table 30
Aquatic Life Water Quality Criteria for Toxic Pollutants

No.	Pollutant	CAS Number	Human Health Criterion	Freshwater (µg/L)		Saltwater (µg/L)	
				Acute Criterion (CMC)	Chronic Criterion (CCC)	Acute Criterion (CMC)	Chronic Criterion (CCC)
17~~1~~4	Cyanide	57125	y	22 [J]	5.2 [J]	1 [J]	1 [J]
[J] *This criterion is expressed as µg free cyanide (CN)/L.*							
18~~1~~5	DDT 4,4'	50293	y	1.1 [A, G]	0.001 [A, G]	0.13 [A, G]	0.001 [A, G]
[A] *See expanded endnote A at bottom of Table 30 for alternate frequency and duration of this criterion.* [G] *This criterion applies to DDT and its metabolites (i.e. the total concentration of DDT and its metabolites should not exceed this value).*							
19~~1~~6	*Demeton*	8065483	n	--	0.1	--	0.1
20	*Diazinon*	333415	n	0.17	0.17	0.82	0.82
NOTE: These diazinon criteria are not applicable for Clean Water Act purposes until approved by EPA.							
21~~1~~7	Dieldrin	60571	y	0.24	0.056	0.71[A]	0.0019[A]
[A] *See expanded endnote A at bottom of Table 30 for alternate frequency and duration of this criterion.*							
22~~1~~8	Endosulfan	115297	n	0.22 [A, H]	0.056 [A, H]	0.034 [A, H]	0.0087 [A, H]
[A] *See expanded endnote A at bottom of Table 30 for alternate frequency and duration of this criterion.* [H] *This value is based on the criterion published in Ambient Water Quality Criteria for Endosulfan (EPA 440/5-80-046) and should be applied as the sum of alpha- and beta-endosulfan.*							
23~~1~~9	Endosulfan Alpha	959988	y	0.22 [A]	0.056 [A]	0.034 [A]	0.0087 [A]
[A] *See expanded endnote A at bottom of Table 30 for alternate frequency and duration of this criterion.*							
24~~2~~0	Endosulfan Beta	33213659	y	0.22 [A]	0.056 [A]	0.034 [A]	0.0087 [A]
[A] *See expanded endnote A at bottom of Table 30 for alternate frequency and duration of this criterion.*							

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Table 30
Aquatic Life Water Quality Criteria for Toxic Pollutants

No.	Pollutant	CAS Number	Human Health Criterion	Freshwater (µg/L)		Saltwater (µg/L)	
				Acute Criterion (CMC)	Chronic Criterion (CCC)	Acute Criterion (CMC)	Chronic Criterion (CCC)
25~~21~~	Endrin	72208	y	0.086	0.036	0.037 [A]	0.0023 [A]
[A] *See expanded endnote A at bottom of Table 30 for alternate frequency and duration of this criterion.*							
26~~22~~	*Guthion*	86500	n	--	0.01	--	0.01
27~~23~~	Heptachlor	76448	y	0.52 [A]	0.0038 [A]	0.053 [A]	0.0036 [A]
[A] *See expanded endnote A at bottom of Table 30 for alternate frequency and duration of this criterion.*							
28~~24~~	Heptachlor Epoxide	1024573	y	0.52 [A]	0.0038 [A]	0.053 [A]	0.0036 [A]
[A] *See expanded endnote A at bottom of Table 30 for alternate frequency and duration of this criterion.*							
29~~25~~	*Iron (total)*	7439896	n	--	1000	--	--
30~~26~~	Lead	7439921	n	*See* **C , F**	*See* **C , F**	210 [C]	8.1 [C]
[C] *Criterion is expressed in terms of "dissolved" concentrations in the water column.* [F] *The freshwater criterion for this metal is expressed as a function of hardness (mg/L) in the water column. To calculate the criterion, use formula under expanded endnote F at bottom of Table 30.*							
31~~27~~	*Malathion*	121755	n	--	0.1	--	0.1
32~~28~~	Mercury (total)	7439976	n	2.4	0.012	2.1	0.025
33~~29~~	*Methoxychlor*	72435	y	--	0.03	--	0.03
34~~30~~	*Mirex*	2385855	n	--	0.001	--	0.001

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Table 30
Aquatic Life Water Quality Criteria for Toxic Pollutants

No.	Pollutant	CAS Number	Human Health Criterion	Freshwater (µg/L)		Saltwater (µg/L)	
				Acute Criterion (CMC)	Chronic Criterion (CCC)	Acute Criterion (CMC)	Chronic Criterion (CCC)
353 ~~1~~	Nickel	7440020	y	*See* **C , F**	*See* **C , F**	74 [C]	8.2 [C]
[C] *Criterion is expressed in terms of "dissolved" concentrations in the water column.* [F] *The freshwater criterion for this metal is expressed as a function of hardness (mg/L) in the water column. To calculate the criterion, use formula under expanded endnote F at bottom of Table 30.*							
363 ~~2~~	*Parathion*	56382	n	0.065	0.013	--	--
373 ~~3~~	Pentachlorophenol	87865	y	*See* **I**	*See* **I**	13	7.9
[I] *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).*							
383 ~~4~~	*Phosphorus Elemental*	7723140	n	--	--	--	0.1
393 ~~5~~	Polychlorinated Biphenyls (PCBs)	NA	y	2 [K]	0.014 [K]	10 [K]	0.03 [K]
[K] *This criterion applies to total PCBs (e.g.* determined as Aroclors or congeners)							
403 ~~6~~	Selenium	7782492	y	*See* **C , L**	4.6 [C]	290 [C]	71 [C]
[C] *Criterion is expressed in terms of "dissolved" concentrations in the water column.* [L] *The CMC=(1/[(f1/CMC1)+(f2/CMC2)]µg/L) * CF 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 12.82 µg/L, respectively. See expanded endnote F for the Conversion Factor (CF) for selenium.*							
413 ~~7~~	Silver	7440224	n	*See* **C , F**	0.10 [C]	1.9 [C]	--
[C] *Criterion is expressed in terms of "dissolved" concentrations in the water column.* [F] *The freshwater acute criterion for this metal is expressed as a function of hardness (mg/L) in the water column. To calculate the criterion, use formula under expanded endnote F at bottom of Table 30.*							

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Table 30
Aquatic Life Water Quality Criteria for Toxic Pollutants

No.	Pollutant	CAS Number	Human Health Criterion	Freshwater (µg/L)		Saltwater (µg/L)	
				Acute Criterion (CMC)	Chronic Criterion (CCC)	Acute Criterion (CMC)	Chronic Criterion (CCC)
423~~3~~ ~~8~~	*Sulfide Hydrogen Sulfide*	7783064	n	--	2	--	2
433~~3~~ ~~9~~	Toxaphene	8001352	y	0.73	0.0002	0.21	0.0002
444 ~~0~~	*Tributyltin (TBT)*	688733	n	0.46	~~0.063~~ 0.072	~~0.37~~ 0.42	~~0.01~~ 0.0074
NOTE: The freshwater chronic and saltwater acute and chronic criteria for tributyltin are not applicable for Clean Water Act purposes until the revised Table 30 values are approved by EPA. The freshwater acute criterion is not changing and is applicable. The following tributyltin criteria remain applicable until EPA approves the revised criteria shown in Table 30: the freshwater chronic (CCC) is 0.063 µg/L, the saltwater acute (CMC) is 0.37 µg/L, and the saltwater chronic (CCC) is 0.01 µg/L.							
454 ~~1~~	Zinc	7440666	y	*See* **C , F**	*See* **C , F**	90 [C]	81 [C]

[C] *Criterion is expressed in terms of "dissolved" concentrations in the water column.*

[F] *The freshwater criterion for this metal is expressed as a function of hardness (mg/L) in the water column. To calculate the criterion, use formula under expanded endnote F at bottom of Table 30.*

Expanded Endnotes A, ~~E,~~ F, N, O

Endnote A: Alternate Frequency and Duration for Certain Pesticides

This criterion is based on EPA recommendations issued in 1980 that were derived using guidelines that differed from EPA's 1985 Guidelines which update minimum data requirements and derivation

procedures. The CMC may not be exceeded at any time and the CCC may not be exceeded based on a 24-hour average. The CMC may be applied using a one hour averaging period not to be exceeded more than once every three years, if the CMC values given in Table 30 are divided by 2 to obtain a value that is more comparable to a CMC derived using the 1985 Guidelines.

Endnote E: Equation for Hardness-Dependent Freshwater Cadmium Acute Criteria

The freshwater criterion for this metal is expressed as total recoverable with two significant figures, and is a function of hardness (mg/L) in the water column. Criteria values based on hardness are calculated using the following formula (CMC refers to the acute criterion):

$$\mathbf{CMC} = (\exp(m_A*[\ln(\text{hardness})] + b_A))$$

Chemical	m_A	b_A	m_C	b_C
Cadmium	1.128	-3.828	N/A	N/A

Endnote F: Equations for Hardness-Dependent Freshwater Metals Criteria and Conversion Factor Table

The freshwater criterion for this metal is expressed as dissolved with two significant figures, and is a function of hardness (mg/L) in the water column. Criteria values based on hardness are calculated using the following formulas (CMC refers to the acute criterion; CCC refers to the chronic criterion):

$$\textbf{CMC} = (\exp(m_A*[\ln(\text{hardness})] + b_A))*CF$$

$$\textbf{CCC} = (\exp(m_C*[\ln(\text{hardness})] + b_C))*CF$$

"CF" is the conversion factor used for converting a metal criterion expressed as the total recoverable fraction in the water column to a criterion expressed as the dissolved fraction in the water column.

Values for Calculating Hardness-Dependent Metals Criteria				
Chemical	**m_A**	**b_A**	**m_C**	**b_C**
Cadmium	~~N/A~~0.9789	-3.866 ~~N/A~~	0.7409	-4.719
Chromium III	0.8190	3.7256	0.8190	0.6848
Lead	1.273	-1.460	1.273	-4.705
Nickel	0.8460	2.255	0.8460	0.0584
Silver	1.72	-6.59	--	--
Zinc	0.8473	0.884	0.8473	0.884

The conversion factors (CF) below must be used in the equations above for the hardness-dependent metals in order to convert total recoverable metals criteria to dissolved metals criteria. For metals that are not hardness-dependent (i.e. arsenic, chromium VI, selenium, and silver (chronic)), or are saltwater criteria, the criterion value associated with the metal in Table 30 already reflects a dissolved criterion based on its conversion factor below.

Conversion Factor (CF) Table for Dissolved Metals				
Chemical	Freshwater		Saltwater	
	Acute	Chronic	Acute	Chronic
Arsenic	1.000	1.000	1.000	1.000
Cadmium	1.136672-[(ln hardness)(0.041838)]~~N/A~~	1.101672-[(ln hardness)(0.041838)]	0.994	0.994
Chromium III	0.316	0.860	--	--
Chromium VI	0.982	0.962	0.993	0.993
Copper	N/A	N/A	0.83	0.83
Lead	1.46203-[(ln hardness)(0.145712)]	1.46203-[(ln hardness)(0.145712)]	0.951	0.951
Nickel	0.998	0.997	0.990	0.990
Selenium	0.996	0.922	0.998	0.998
Silver	0.85	0.85	0.85	--
Zinc	0.978	0.986	0.946	0.946

NOTE: Cadmium values m_A, m_B, and the freshwater acute CF in Endnote F are not applicable until the freshwater acute cadmium criterion in Table 30 is approved by EPA. Until then the federally promulgated freshwater acute cadmium criterion at 40 CFR 131.46 remains applicable for CWA purposes.

Endnote N: Deriving freshwater copper criteria

The freshwater copper criteria at any time are the Biotic Ligand Model (BLM) derived Instantaneous Water Quality Criteria (IWQC) output based on a concurrently measured set of model input parameter values. The Biotic Ligand Model uses multiple ambient water quality parameters to derive 1-hour acute exposure (CMC) and 96-hour chronic exposure (CCC) water quality criteria (IWQC) for copper based on the site specific water chemistry that determines the toxicity of copper to aquatic life. If measured data for one or more of the model input parameters used to derive the acute and chronic IWQC is not available, the procedures in section (1) or (2) of this endnote will be used as specified to substitute an estimate or a default value for the missing input parameter. BLM results (IWQC) based on sufficient measured input parameter data are more accurate and supersede results based on estimates or default values. The acceptable BLM software to calculate the IWQC include version 2.2.3, referenced in "Aquatic Life Ambient Freshwater Quality Criteria – Copper": EPA-822-R-07-001, February 2007, and version 2.2.4. The criteria are expressed as dissolved copper in micrograms per liter (to the nearest one-tenth).

(1) Input Parameter Substitution and Estimation Procedures to Derive BLM Criteria (IWQC)

If the measured value for any input parameter needed to derive an IWQC using the BLM is not available, DEQ will substitute an estimated input parameter value according to the procedures described in this section [Endnote N (1)]. If the data required to determine the estimated parameter value is not available, DEQ will use default values derived according to the procedures in Endnote N (2).

(a) Total recoverable concentration measurements will be substituted for dissolved concentration measurements that are not available. For alkalinity, calcium, chloride, magnesium, potassium, sodium and sulfate, total recoverable concentration measurements will be used as a direct substitute for dissolved concentration measurements. Total organic carbon (TOC) measurements will be multiplied by 0.83 to convert the TOC value to an equivalent dissolved organic carbon (DOC) value; except where sufficient TOC and DOC data are available for a site, DEQ will calculate and apply a site-specific translator in place of 0.83 to convert TOC values to DOC for use in the BLM.

(b) Alkalinity, calcium, chloride, magnesium, potassium, sodium and sulfate:
If data for any of these BLM input parameters are missing from a particular dataset, DEQ will estimate its value based on the relationship of the ion or alkalinity to specific conductance measurements for that data set using the regression analysis equations in Table 1. Specific conductance measurements must be concurrent with the other BLM input parameters dataset.

Table N-1	
Parameter	**Regression Equation**
Alkalinity	$Alk. = \exp^{(0.88 \cdot [\ln(SpC)] - 0.41)}$
Calcium	$Ca = \exp^{(0.96 \cdot [\ln(SpC)] - 2.29)}$
Chloride	$Cl = \exp^{(1.15 \cdot [\ln(SpC)] - 3.82)}$
Magnesium	$Mg = \exp^{(0.91 \cdot [\ln(SpC)] - 3.09)}$
Potassium	$K = \exp^{(0.84 \cdot [\ln(SpC)] - 3.74)}$
Sodium	$Na = \exp^{(0.86 \cdot [\ln(SpC)] - 2.22)}$
Sulfate	$SO_4 = \exp^{(1.45 \cdot [\ln(SpC)] - 5.59}$

Where, "SpC" is a measurement of specific conductance in μmhos/cm, "ln" is the natural logarithm, and "exp" is a mathematical constant that is the base of the natural logarithm.

(c) pH
If concurrent pH data is missing from the sample dataset, DEQ will use a representative pH value determined by interpolating from data available for the site or proximate monitoring locations where conditions (such as type of water body, stream flow and geology) are similar to the site. DEQ will use the available data and methods to produce the best practicable estimate of pH for the site and time for which the IWQC is being derived.

(d) Temperature
If concurrent temperature data is missing from the sample dataset, DEQ will use a monthly mean temperature based on data available for the site or proximate monitoring locations where conditions (such as type of water body and stream flow) are similar to the site.

(e) Humic Acid
If sufficient high quality data on the percentage of humic acid as a proportion of DOC is available for a site, DEQ will use that value in the BLM in place of the default value of 10% used in the model.

(2) Default Action Values

If the measured value for DOC, alkalinity, calcium, chloride, magnesium, potassium, sodium or sulfate is not available to derive an IWQC using the BLM, and the parameter value cannot be estimated as specified in section (1) above, DEQ will use a conservative input value for the missing parameter as described in this section [Endnote N (2)] to derive a default action value using the Biotic Ligand Model. The default action value will be used for Clean Water Act purposes until measured or estimated input parameter data are available to derive accurate copper criteria (IWQC) based on site specific water chemistry.

(a) The default input parameter values for DOC, alkalinity calcium, chloride, magnesium, potassium, sodium and sulfate will be the percentile value from the distribution of the high quality data available for surface waters in the region as shown in Table N-2.

Table N-2 Percentile of data distribution to be used as default value by region		
Region	**DOC** percentile	**Alkalinity and Ions** percentile
Willamette	20th	20th
Coastal	20th	20th
Cascades	20th	20th
Eastern	15th	15th
Columbia River	20th	20th

(b) The regional default values for each parameter and region will be updated periodically as additional high quality data becomes available and is added to DEQ's database.
(c) The regional default values for each parameter are available on DEQ's website.
(d) The regions listed in Table N-2 are comprised of the following EPA Level III ecoregions or waterbody:
(i) Willamette: the Willamette Valley
(ii) Coastal: Coast Range and Klamath Mountains
(iii) Cascades: Cascades
(iv) Eastern: Eastern Cascades Slopes and Foothills, Columbia Plateau, Blue Mountains, Northern Basin and Range and Snake River Plain
(v) Columbia River: Columbia River mainstem in Oregon

(3) General Policies
(a) The copper BLM derives instantaneous criteria results (IWQC) that vary at a site over time reflecting the effect of local water chemistry on copper toxicity to aquatic organisms. DEQ will apply the BLM criteria for Clean Water Act purposes to protect the water body during the most bioavailable or toxic conditions.
(b) For assessing waters of the state, DEQ will use approaches that give preference to the use of BLM criteria derived with site-specific measured input parameter data.

Endnote O: Determining freshwater aluminum criteria values

Freshwater aluminum criteria values are calculated from a concurrently measured set of Aluminum Criteria Calculator (ACC) input parameter values. The input parameter values are based on the site and time specific water chemistry that determines the toxicity of aluminum to aquatic life. If measured data for one or more of the ACC input parameters is not available, the procedures in section (1), (2), or (3) of this endnote will be used as specified to substitute an estimated or a default value for the missing input parameter or to apply default criteria derived using ecoregional data.

Criteria values based on sufficient concurrent measured input parameter data are more accurate, preferred, and supersede results based on estimates, default values or applied default ecoregional criteria values. The criteria are expressed as total recoverable in micrograms per liter (to two significant figures). Oregon will use analytical methods that measure the bioavailable fraction of aluminum unless total recoverable aluminum measurements are required by Federal regulations.

(1) Input Parameter Estimation Procedures to Derive Aluminum Criteria Values

If the measured value for one or more input parameters needed to derive an aluminum criteria value using the ACC is not available, DEQ will substitute a calculated or estimated input value according to the procedures described in this section [Endnote O (1)].

(a) DOC

DEQ will use total organic carbon (TOC) measurements to estimate DOC measurements that are not available. Total organic carbon (TOC) measurements will be multiplied by 0.83 to convert the TOC value to an equivalent dissolved organic carbon (DOC) value; except where sufficient TOC and DOC data are available for a site, DEQ will calculate and apply a site-specific translator in place of 0.83 to convert TOC values to DOC for use in the Aluminum Criteria Calculator. If neither DOC nor TOC measurements are available, substitute a default DOC value as described in Endnote O (2).

(b) Total Hardness

If total hardness is not available, DEQ will estimate total hardness by substituting dissolved hardness as an input parameter for the Aluminum Criteria Calculator. If neither total nor dissolved hardness data are available, DEQ will use the equation in Table O-1 to estimate total hardness using specific conductance. Specific conductance measurements must be concurrent with the other input parameters for the Aluminum Criteria Calculator. If total hardness cannot be estimated from concurrent data, DEQ will apply the applicable ecoregional default aluminum criterion described in Endnote O (3).

Table O-1
Equation to estimate total hardness from specific conductance

Parameter	Regression Equation
Total Hardness	$\text{Total Hardness} = \exp^{(1.050 \cdot [\ln(\text{SpC})] - 1.211)}$

Where, "SpC" is a measurement of specific conductance in µmhos/cm, "ln" is the natural logarithm, and "exp" is a mathematical constant that is the base of the natural logarithm.

(2) Applying a Default Value for DOC to Derive Aluminum Criteria Values

If concurrently measured DOC is not available to derive a criteria value using the ACC and DOC cannot be estimated as specified in Endnote O (1)(a) above, DEQ will use a conservative default DOC input value as described in this section [Endnote O (2)] to derive the criteria value. The default DOC input value will be used for Clean Water Act purposes until measured or estimated DOC input data are available to derive aluminum criteria values based on site-specific water chemistry.

(a) The default input parameter values for DOC will be the percentile value from the distribution of the high-quality data available for surface waters in the region as shown in Table O-2.

Table O-2 Percentile of data distribution to be used as default value by region	
Region	**DOC** percentile
Willamette	15th
Coastal	30th
Cascades	20th
Eastern	15th
Columbia River	10th

b) The regional default DOC values will be updated periodically as additional high-quality data become available and are added to DEQ's database.

(c) The resulting regional default input values for DOC are shown on DEQ's website.

(d) The regions listed in Table O-2 are the same as those listed in Endnote N(2)(d).

(3) Applying Aluminum Default Ecoregional Criteria

If data for pH is missing or hardness is missing and cannot be estimated as described in Endnote O (1)(b), DEQ will apply an ecoregional default aluminum criteria value.

(a) The default ecoregional acute (CMC) and chronic (CCC) criteria values will be the 10th percentile value from the distribution of all ACC outputs calculated from concurrently measured high quality input data available for Oregon surface waters by EPA Level III ecoregion with the Columbia River mainstem treated separately.

(b) The ecoregional default aluminum criteria values will be updated periodically as additional high quality data become available and are added to DEQ's database.

(c) The resulting ecoregional default aluminum criteria values are shown on DEQ's website.

(4) General Policies

(a) The ACC produces criteria values that vary at a site over time reflecting the effect of local water chemistry on aluminum toxicity to aquatic organisms. To apply the aluminum criteria for Clean Water Act purposes, criteria values based on the full range of ambient water chemistry conditions that occur at a site must be applied to protect the water body, including during conditions when aluminum is most toxic.

(b) When applying the aluminum criteria, DEQ will use approaches that give preference to the use of ACC criteria values based on concurrently measured or estimated input parameter data, as described in Endnote O (1) in the order listed, and concurrently measured aluminum data.

Table 30(a): Ammonia Acute Criteria Values (One-hour Average)—Salmonid Species Present
Temperature and pH-Dependent and expressed as Total Ammonia Nitrogen (mg/L TAN)

Criteria cannot be exceeded more than once every three years

$$Acute\ Criterion = MIN\left(\left(\frac{0.275}{1+10^{7.204-pH}}+\frac{39.0}{1+10^{pH-7.204}}\right),\left(0.7249\times\left(\frac{0.0114}{1+10^{7.204-pH}}+\frac{1.6181}{1+10^{pH-7.204}}\right)\times\left(23.12\times 10^{0.036\times(20-T)}\right)\right)\right)$$

	Temperature (°C)																
pH	**0-14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**
6.5	33	33	32	29	27	25	23	21	19	18	16	15	14	13	12	11	9.9
6.6	31	31	30	28	26	24	22	20	18	17	16	14	13	12	11	10	9.5
6.7	30	30	29	27	24	22	21	19	18	16	15	14	13	12	11	9.8	9.0
6.8	28	28	27	25	23	21	20	18	17	15	14	13	12	11	10	9.2	8.5
6.9	26	26	25	23	21	20	18	17	15	14	13	12	11	10	9.4	8.6	7.9
7.0	24	24	23	21	20	18	17	15	14	13	12	11	10	9.4	8.6	8.0	7.3
7.1	22	22	21	20	18	17	15	14	13	12	11	10	9.3	8.5	7.9	7.2	6.7
7.2	20	20	19	18	16	15	14	13	12	11	9.8	9.1	8.3	7.7	7.1	6.5	6.0
7.3	18	18	17	16	14	13	12	11	10	9.5	8.7	8.0	7.4	6.8	6.3	5.8	5.3
7.4	15	15	15	14	13	12	11	9.8	9.0	8.3	7.7	7.0	6.5	6.0	5.5	5.1	4.7
7.5	13	13	13	12	11	10	9.2	8.5	7.8	7.2	6.6	6.1	5.6	5.2	4.8	4.4	4.0
7.6	11	11	11	10	9.3	8.6	7.9	7.3	6.7	6.2	5.7	5.2	4.8	4.4	4.1	3.8	3.5
7.7	9.6	9.6	9.3	8.6	7.9	7.3	6.7	6.2	5.7	5.2	4.8	4.4	4.1	3.8	3.5	3.2	3.0
7.8	8.1	8.1	7.9	7.2	6.7	6.1	5.6	5.2	4.8	4.4	4.0	3.7	3.4	3.2	2.9	2.7	2.5
7.9	6.8	6.8	6.6	6.0	5.6	5.1	4.7	4.3	4.0	3.7	3.4	3.1	2.9	2.6	2.4	2.2	2.1
8.0	5.6	5.6	5.4	5.0	4.6	4.2	3.9	3.6	3.3	3.0	2.8	2.6	2.4	2.2	2.0	1.9	1.7
8.1	4.6	4.6	4.5	4.1	3.8	3.5	3.2	3.0	2.7	2.5	2.3	2.1	2.0	1.8	1.7	1.5	1.4
8.2	3.8	3.8	3.7	3.5	3.1	2.9	2.7	2.4	2.3	2.1	1.9	1.8	1.6	1.5	1.4	1.3	1.2
8.3	3.1	3.1	3.1	2.8	2.6	2.4	2.2	2.0	1.9	1.7	1.6	1.4	1.3	1.2	1.1	1.0	0.96
8.4	2.6	2.6	2.5	2.3	2.1	2.0	1.8	1.7	1.5	1.4	1.3	1.2	1.1	1.0	0.93	0.86	0.79
8.5	2.1	2.1	2.1	1.9	1.8	1.6	1.5	1.4	1.3	1.2	1.1	0.98	0.90	0.83	0.77	0.71	0.65
8.6	1.8	1.8	1.7	1.6	1.5	1.3	1.2	1.1	1.0	0.96	0.88	0.81	0.75	0.69	0.63	0.59	0.54
8.7	1.5	1.5	1.4	1.3	1.2	1.1	1.0	0.94	0.87	0.80	0.74	0.68	0.62	0.57	0.53	0.49	0.45
8.8	1.2	1.2	1.2	1.1	1.0	0.93	0.86	0.79	0.73	0.67	0.62	0.57	0.52	0.48	0.44	0.41	0.37
8.9	1.0	1.0	1.0	0.93	0.85	0.79	0.72	0.67	0.61	0.56	0.52	0.48	0.44	0.40	0.37	0.34	0.32
9.0	0.88	0.88	0.86	0.79	0.73	0.67	0.62	0.57	0.52	0.48	0.44	0.41	0.37	0.34	0.32	0.29	0.27

Table 30(b): Ammonia Acute Criteria Values (One-hour Average*)—Salmonid Species Absent
Temperature and pH-Dependent and expressed as Total Ammonia Nitrogen (mg/L TAN)

Criteria cannot be exceeded more than once every three years

$$Acute\ Criterion = 0.7249 \times \frac{0.0114}{1+10^{7.204-pH}} + \frac{1.6181}{1+10^{pH-7.204}} \times MIN\left(51.93, 23.12 \times 10^{0.036\times(20-T)}\right)$$

	Temperature (°C)																				
pH	**0-10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**
6.5	51	48	44	41	37	34	32	29	27	25	23	21	19	18	16	15	14	13	12	11	9.9
6.6	49	46	42	39	36	33	30	28	26	24	22	20	18	17	16	14	13	12	11	10	9.5
6.7	46	44	40	37	34	31	29	27	24	22	21	19	18	16	15	14	13	12	11	9.8	9.0
6.8	44	41	38	35	32	30	27	25	23	21	20	18	17	15	14	13	12	11	10	9.2	8.5
6.9	41	38	35	32	30	28	25	23	21	20	18	17	15	14	13	12	11	10	9.4	8.6	7.9
7.0	38	35	33	30	28	25	23	21	20	18	17	15	14	13	12	11	10	9.4	8.6	7.9	7.3
7.1	34	32	30	27	25	23	21	20	18	17	15	14	13	12	11	10	9.3	8.5	7.9	7.2	6.7
7.2	31	29	27	25	23	21	19	18	16	15	14	13	12	11	9.8	9.1	8.3	7.7	7.1	6.5	6.0
7.3	27	26	24	22	20	18	17	16	14	13	12	11	10	9.5	8.7	8.0	7.4	6.8	6.3	5.8	5.3
7.4	24	22	21	19	18	16	15	14	13	12	11	9.8	9.0	8.3	7.7	7.0	6.5	6.0	5.5	5.1	4.7
7.5	21	19	18	17	15	14	13	12	11	10	9.2	8.5	7.8	7.2	6.6	6.1	5.6	5.2	4.8	4.4	4.0
7.6	18	17	15	14	13	12	11	10	9.3	8.6	7.9	7.3	6.7	6.2	5.7	5.2	4.8	4.4	4.1	3.8	3.5
7.7	15	14	13	12	11	10	9.3	8.6	7.9	7.3	6.7	6.2	5.7	5.2	4.8	4.4	4.1	3.8	3.5	3.2	2.9
7.8	13	12	11	10	9.3	8.5	7.9	7.2	6.7	6.1	5.6	5.2	4.8	4.4	4.0	3.7	3.4	3.2	2.9	2.7	2.5
7.9	11	9.9	9.1	8.4	7.7	7.1	6.6	3.0	5.6	5.1	4.7	4.3	4.0	3.7	3.4	3.1	2.9	2.6	2.4	2.2	2.1
8.0	8.8	8.2	7.6	7.0	6.4	5.9	5.4	5.0	4.6	4.2	3.9	3.6	3.3	3.0	2.8	2.6	2.4	2.2	2.0	1.9	1.7
8.1	7.2	6.8	6.3	5.8	5.3	4.9	4.5	4.1	3.8	3.5	3.2	3.0	2.7	2.5	2.3	2.1	2.0	1.8	1.7	1.5	1.4
8.2	6.0	5.6	5.2	4.8	4.4	4.0	3.7	3.4	3.1	2.9	2.7	2.4	2.3	2.1	1.9	1.8	1.6	1.5	1.4	1.3	1.2
8.3	4.9	4.6	4.3	3.9	3.6	3.3	3.1	2.8	2.6	2.4	2.2	2.0	1.9	1.7	1.6	1.4	1.3	1.2	1.1	1.0	0.96
8.4	4.1	3.8	3.5	3.2	3.0	2.7	2.5	2.3	2.1	2.0	1.8	1.7	1.5	1.4	1.3	1.2	1.1	1.0	0.93	0.86	0.79
8.5	3.3	3.1	2.9	2.7	2.4	2.3	2.1	1.9	1.8	1.6	1.5	1.4	1.3	1.2	1.1	0.98	0.90	0.83	0.77	0.71	0.65
8.6	2.8	2.6	2.4	2.2	2.0	1.9	1.7	1.6	1.5	1.3	1.2	1.1	1.0	0.96	0.88	0.81	0.75	0.69	0.63	0.58	0.54
8.7	2.3	2.2	2.0	1.8	1.7	1.6	1.4	1.3	1.2	1.1	1.0	0.94	0.87	0.80	0.74	0.68	0.62	0.57	0.53	0.49	0.45
8.8	1.9	1.8	1.7	1.5	1.4	1.3	1.2	1.1	1.0	0.93	0.86	0.79	0.73	0.67	0.62	0.57	0.52	0.48	0.44	0.41	0.37
8.9	1.6	1.5	1.4	1.3	1.2	1.1	1.0	0.93	0.85	0.79	0.72	0.67	0.61	0.56	0.52	0.48	0.44	0.40	0.37	0.34	0.32
9.0	1.4	1.3	1.2	1.1	1.0	0.93	0.86	0.79	0.73	0.67	0.62	0.57	0.52	0.48	0.44	0.41	0.37	0.34	0.32	0.29	0.27

Table 30(c): Ammonia Chronic Criteria Values (30-day Rolling Average*)

Temperature and pH-Dependent and expressed as Total Ammonia Nitrogen (mg/L TAN)

* The highest four-day average within the 30-day averaging period must not be more than 2.5 times the chronic value

Criteria cannot be exceeded more than once every three years

$$Chronic\ Criterion = 0.8876 \times \left(\frac{0.0278}{1+10^{7.688-pH}} + \frac{1.1994}{1+10^{pH-7.688}}\right) \times \left(2.126 \times 10^{0.028\times(20-MAX(T,7))}\right)$$

	Temperature (°C)																							
pH	**0-7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**
6.5	4.9	4.6	4.3	4.1	3.8	3.6	3.3	3.1	2.9	2.8	2.6	2.4	2.3	2.1	2.0	1.9	1.8	1.6	1.5	1.5	1.4	1.3	1.2	1.1
6.6	4.8	4.5	4.3	4.0	3.8	3.5	3.3	3.1	2.9	2.7	2.5	2.4	2.2	2.1	2.0	1.8	1.7	1.6	1.5	1.4	1.3	1.3	1.2	1.1
6.7	4.8	4.5	4.2	3.9	3.7	3.5	3.2	3.0	2.8	2.7	2.5	2.3	2.2	2.1	1.9	1.8	1.7	1.6	1.5	1.4	1.3	1.2	1.2	1.1
6.8	4.6	4.4	4.1	3.8	3.6	3.4	3.2	3.0	2.8	2.6	2.4	2.3	2.1	2.0	1.9	1.8	1.7	1.6	1.5	1.4	1.3	1.2	1.1	1.1
6.9	4.5	4.2	4.0	3.7	3.5	3.3	3.1	2.9	2.7	2.5	2.4	2.2	2.1	2.0	1.8	1.7	1.6	1.5	1.4	1.3	1.2	1.2	1.1	1.0
7.0	4.4	4.1	3.8	3.6	3.4	3.2	3.0	2.8	2.6	2.4	2.3	2.2	2.0	1.9	1.8	1.7	1.6	1.5	1.4	1.3	1.2	1.1	1.1	0.99
7.1	4.2	3.9	3.7	3.5	3.2	3.0	2.8	2.7	2.5	2.3	2.2	2.1	1.9	1.8	1.7	1.6	1.5	1.4	1.3	1.2	1.2	1.1	1.0	0.95
7.2	4.0	3.7	3.5	3.3	3.1	2.9	2.7	2.5	2.4	2.2	2.1	2.0	1.8	1.7	1.6	1.5	1.4	1.3	1.3	1.2	1.1	1.0	0.96	0.90
7.3	3.8	3.5	3.3	3.1	2.9	2.7	2.6	2.4	2.2	2.1	2.0	1.8	1.7	1.6	1.5	1.4	1.3	1.3	1.2	1.1	1.0	0.97	0.91	0.85
7.4	3.5	3.3	3.1	2.9	2.7	2.5	2.4	2.2	2.1	2.0	1.8	1.7	1.6	1.5	1.4	1.3	1.3	1.2	1.1	1.0	0.96	0.90	0.85	0.79
7.5	3.2	3.0	2.8	2.7	2.5	2.3	2.2	2.1	1.9	1.8	1.7	1.6	1.5	1.4	1.3	1.2	1.2	1.1	1.0	0.95	0.89	0.83	0.78	0.73
7.6	2.9	2.8	2.6	2.4	2.3	2.1	2.0	1.9	1.8	1.6	1.5	1.4	1.4	1.3	1.2	1.1	1.1	0.98	0.92	0.86	0.81	0.76	0.71	0.67
7.7	2.6	2.4	2.3	2.2	2.0	1.9	1.8	1.7	1.6	1.5	1.4	1.3	1.2	1.1	1.1	1.0	0.94	0.88	0.83	0.78	0.73	0.68	0.64	0.60
7.8	2.3	2.2	2.1	1.9	1.8	1.7	1.6	1.5	1.4	1.3	1.2	1.2	1.1	1.0	0.95	0.89	0.84	0.79	0.74	0.69	0.65	0.61	0.57	0.53
7.9	2.1	1.9	1.8	1.7	1.6	1.5	1.4	1.3	1.2	1.2	1.1	1.0	0.95	0.89	0.84	0.79	0.74	0.69	0.65	0.61	0.57	0.53	0.50	0.47
8.0	1.8	1.7	1.6	1.5	1.4	1.3	1.2	1.1	1.1	1.0	0.94	0.88	0.83	0.78	0.73	0.68	0.64	0.60	0.56	0.53	0.50	0.44	0.44	0.41
8.1	1.5	1.5	1.4	1.3	1.2	1.1	1.1	0.99	0.92	0.87	0.81	0.76	0.71	0.67	0.63	0.59	0.55	0.52	0.49	0.46	0.43	0.40	0.38	0.35
8.2	1.3	1.2	1.2	1.1	1.0	0.96	0.90	0.84	0.79	0.74	0.70	0.65	0.61	0.57	0.54	0.50	0.47	0.44	0.42	0.39	0.37	0.34	0.32	0.30
8.3	1.1	1.1	0.99	0.93	0.87	0.82	0.76	0.72	0.67	0.63	0.59	0.55	0.52	0.49	0.46	0.43	0.40	0.38	0.35	0.33	0.31	0.29	0.27	0.26
8.4	0.95	0.89	0.84	0.79	0.74	0.69	0.65	0.61	0.57	0.53	0.50	0.47	0.44	0.41	0.39	0.36	0.34	0.32	0.30	0.28	0.26	0.25	0.23	0.22
8.5	0.80	0.75	0.71	0.67	0.62	0.58	0.55	0.51	0.48	0.45	0.42	0.40	0.37	0.35	0.33	0.31	0.29	0.27	0.25	0.24	0.22	0.21	0.20	0.18
8.6	0.68	0.64	0.60	0.56	0.53	0.49	0.46	0.43	0.41	0.38	0.36	0.33	0.31	0.29	0.28	0.26	0.24	0.23	0.21	0.20	0.19	0.18	0.16	0.15
8.7	0.57	0.54	0.51	0.47	0.44	0.42	0.39	0.37	0.34	0.32	0.30	0.28	0.27	0.25	0.23	0.22	0.21	0.19	0.18	0.17	0.16	0.15	0.14	0.13
8.8	0.49	0.46	0.43	0.40	0.38	0.35	0.33	0.31	0.29	0.27	0.26	0.24	0.23	0.21	0.20	0.19	0.17	0.16	0.15	0.14	0.13	0.13	0.12	0.11
8.9	0.42	0.39	0.37	0.34	0.32	0.30	0.28	0.27	0.25	0.23	0.22	0.21	0.19	0.18	0.17	0.16	0.15	0.14	0.13	0.12	0.12	0.11	0.10	0.09
9.0	0.36	0.34	0.32	0.30	0.28	0.26	0.24	0.23	0.21	0.20	0.19	0.18	0.17	0.16	0.15	0.14	0.13	0.12	0.11	0.11	0.10	0.09	0.09	0.08

OAR 340-041-8033
TABLE 31
Aquatic Life Water Quality Guidance Values for Toxic Pollutants

Effective April 18, 2014

Water Quality Guidance Values Summary[A]

The concentration for each compound listed in Table 31 is a guidance value that DEQ may use in application of Oregon's Toxic Substances Narrative (340-041-0033(2)) to waters of the state in order to protect aquatic life. All values are expressed as micrograms per liter (µg/L) except where noted. Compounds are listed in alphabetical order with the corresponding EPA number (from National Recommended Water Quality Criteria: 2002, EPA-822-R-02-047), corresponding Chemical Abstract Service (CAS) number, aquatic life freshwater acute and chronic guidance values, and aquatic life saltwater acute and chronic guidance values.

OAR 340-041-8033
Table 31
Aquatic Life Water Quality Guidance Values for Toxic Pollutants

EPA No.	Pollutant	CAS Number	Freshwater		Saltwater	
			Acute	Chronic	Acute	Chronic
56	Acenaphthene	83329	1,700	520	970	710
17	Acrolein	107028	68	21	55	
18	Acrylonitrile	107131	7,550	2,600		
1	Antimony	7440360	9,000	1,600		
19	Benzene	71432	5,300		5,100	700
59	Benzidine	92875	2,500			
3	Beryllium	7440417	130	5.3		
19 B	BHC (Hexachlorocyclohexane-Technical)	319868	100		0.34	
21	Carbon Tetrachloride	56235	35,200		50,000	

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Table 31
Aquatic Life Water Quality Guidance Values for Toxic Pollutants

EPA No.	Pollutant	CAS Number	Freshwater		Saltwater	
			Acute	Chronic	Acute	Chronic
	Chlorinated Benzenes		250	50	160	129
	Chlorinated naphthalenes		1,600		7.5	
	Chloroalkyl Ethers		238,000			
26	Chloroform	67663	28,900	1,240		
45	Chlorophenol 2-	95578	4,380	2,000		
	Chlorophenol 4-	106489			29,700	
52	Methyl-4-chlorophenol 3-	59507	30			
5a	Chromium (III)	16065831			10,300	
109	DDE 4,4'-	72559	1,050		14	
110	DDD 4,4'-	72548	0.06		3.6	
	Diazinon	333415	0.08	0.05		
	Dichlorobenzenes		1,120	763	1,970	
29	Dichloroethane 1,2-	107062	118,000	20,000	113,000	
	Dichloroethylenes		11,600		224,000	
46	Dichlorophenol 2,4-	120832	2,020	365		
31	Dichloropropane 1,2-	78875	23,000	5,700	10,300	3,040
32	Dichloropropene 1,3-	542756	6,060	244	790	
47	Dimethylphenol 2,4-	105679	2,120			
	Dinitrotoluene		330	230	590	370
16	Dioxin (2,3,7,8-TCDD)	1746016	0.01	38 pg/L		
85	Diphenylhydrazine 1,2-	122667	270			

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Table 31
Aquatic Life Water Quality Guidance Values for Toxic Pollutants

EPA No.	Pollutant	CAS Number	Freshwater		Saltwater	
			Acute	Chronic	Acute	Chronic
33	Ethylbenzene	100414	32,000		430	
86	Fluoranthene	206440	3,980		40	16
	Haloethers		360	122		
	Halomethanes		11,000		12,000	6,400
89	Hexachlorobutadiene	87683	90	9.3	32	
90	Hexachlorocyclopentadiene	77474	7	5.2	7	
91	Hexachloroethane	67721	980	540	940	
93	Isophorone	78591	117,000		12,900	
94	Naphthalene	91203	2,300	620	2,350	
95	Nitrobenzene	98953	27,000		6,680	
	Nitrophenols		230	150	4,850	
26 B	Nitrosamines	35576911	5,850		3,300,000	
	Pentachlorinated ethanes	-	7,240	1,100	390	281
54	Phenol	108952	10,200	2,560	5,800	-
	Phthalate esters	-	940	3	2,944	3.4
	Polynuclear Aromatic Hydrocarbons	-	-	-	300	-
	Tetrachlorinated Ethanes	-	9,320	-	-	-
37	Tetrachloroethane 1,1,2,2-	79345	-	2,400	9,020	-
	Tetrachloroethanes	-	9,320	-	-	-

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Table 31
Aquatic Life Water Quality Guidance Values for Toxic Pollutants

EPA No.	Pollutant	CAS Number	Freshwater		Saltwater	
			Acute	Chronic	Acute	Chronic
38	Tetrachloroethylene	127184	5,280	840	10,200	450
	Tetrachlorophenol 2,3,5,6	-	-	-	-	440
12	Thallium	7440280	1,400	40	2,130	-
39	Toluene	108883	17,500	-	6,300	5,000
	Trichlorinated ethanes	-	18,000	-	-	-
41	Trichloroethane 1,1,1-	71556	-	-	31,200	-
42	Trichloroethane 1,1,2-	79005	-	9,400	-	-
43	Trichloroethylene	79016	45,000	21,900	2,000	-
55	Trichlorophenol 2,4,6-	88062	-	970	-	-

The following chemicals/compounds/classes are of concern due to the potential for toxic effects to aquatic organisms; however, no guidance values are designated. If these compounds are identified in the waste stream, then a review of the scientific literature may be appropriate for deriving guidance values.

- Polybrominated diphenyl ethers (PBDE)
- Polybrominated biphenyls (PBB)
- Pharmaceuticals
- Personal care products
- Alkyl Phenols
- Other chemicals with Toxic effects

Footnotes:

A - Values in Table 31 are applicable to all basins.

B - This number was assigned to the list of non-priority pollutants in National Recommended Water Quality Criteria: 2002 (EPA-822-R-02-047).

State of Oregon Department of Environmental Quality

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Table 40

Human Health Water Quality Criteria for Toxic Pollutants

Effective April 18, 2014

Human Health Criteria Summary

The concentration for each pollutant listed in Table 40 was derived to protect Oregonians from potential adverse health impacts associated with long-term exposure to toxic substances associated with consumption of fish, shellfish, and water. The "organism only" criteria are established to protect fish and shellfish consumption and apply to waters of the state designated for fishing. The "water + organism" criteria are established to protect the consumption of drinking water, fish, and shellfish, and apply where both fishing and domestic water supply (public and private) are designated uses. All criteria are expressed as micrograms per liter (µg/L), unless otherwise noted. Pollutants are listed in alphabetical order. Additional information includes the Chemical Abstract Service (CAS) number, whether the criterion is based on carcinogenic effects (can cause cancer in humans), and whether there is an aquatic life criterion for the pollutant (i.e. "y"= yes, "n" = no). All the human health criteria were calculated using a fish consumption rate of 175 grams per day unless otherwise noted. A fish consumption rate of 175 grams per day is approximately equal to 23 8-ounce fish meals per month. For pollutants categorized as carcinogens, values represent a cancer risk of one additional case of cancer in one million people (i.e. 10^{-6}), unless otherwise noted. All metals criteria are for total metal concentration, unless otherwise noted. Italicized pollutants represent non-priority pollutants. ~~The human health criteria revisions established by OAR 340-041-0033 and shown in Table 40 do not become applicable for purposes of ORS chapter 468B or the federal Clean Water Act until approved by EPA pursuant to 40 CFR 131.21 (4/27/2000).~~

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Table 40
Human Health Water Quality Criteria for Toxic Pollutants

No.	Pollutant	CAS Number	Carcinogen	Aquatic Life Criterion	Human Health Criteria for the Consumption of:	
					Water + Organism (µg/L)	Organism Only (µg/L)
1	Acenaphthene	83329	n	n	95	99
2	Acrolein	107028	n	n	0.88	0.93
3	Acrylonitrile	107131	y	n	0.018	0.025
4	Aldrin	309002	y	y	0.0000050	0.0000050
5	Anthracene	120127	n	n	2900	4000
6	Antimony	7440360	n	n	5.1	64
7	Arsenic (inorganic) [A]	7440382	y	y	2.1	2.1(freshwater) 1.0 (saltwater)
[A] *The arsenic criteria are expressed as total inorganic arsenic. The "organism only" freshwater criterion is based on a risk level of approximately 1 x 10^{-5}, and the "water + organism" criterion is based on a risk level of 1 x 10^{-4}.*						
8	Asbestos [B]	1332214	y	n	7,000,000 fibers/L	--
[B] *The human health risks from asbestos are primarily from drinking water, therefore no "organism only" criterion was developed. The "water + organism" criterion is based on the Maximum Contaminant Level (MCL) established under the Safe Drinking Water Act.*						
9	*Barium* [C]	7440393	n	n	1000	--
[C] *The human health criterion for barium is the same as originally published in the 1976 EPA Red Book which predates the 1980 methodology and did not utilize the fish ingestion BCF approach. This same criterion value was also published in the 1986 EPA Gold Book. Human health risks are primarily from drinking water, therefore no "organism only" criterion was developed. The "water + organism" criterion is based on the Maximum Contaminant Level (MCL) established under the Safe Drinking Water Act.*						
10	Benzene	71432	y	n	0.44	1.4
11	Benzidine	92875	y	n	0.000018	0.000020
12	Benz(a)anthracene	56553	y	n	0.0013	0.0018
13	Benzo(a)pyrene	50328	y	n	0.0013	0.0018

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Table 40
Human Health Water Quality Criteria for Toxic Pollutants

No.	Pollutant	CAS Number	Carcinogen	Aquatic Life Criterion	Human Health Criteria for the Consumption of:	
					Water + Organism (µg/L)	Organism Only (µg/L)
14	Benzo(b)fluoranthene 3,4	205992	y	n	0.0013	0.0018
15	Benzo(k)fluoranthene	207089	y	n	0.0013	0.0018
16	BHC Alpha	319846	y	n	0.00045	0.00049
17	BHC Beta	319857	y	n	0.0016	0.0017
18	BHC Gamma (Lindane)	58899	n	y	0.17	0.18
19	Bromoform	75252	y	n	3.3	14
20	Butylbenzyl Phthalate	85687	n	n	190	190
21	Carbon Tetrachloride	56235	y	n	0.10	0.16
22	Chlordane	57749	y	y	0.000081	0.000081
23	Chlorobenzene	108907	n	n	74	160
24	Chlorodibromomethane	124481	y	n	0.31	1.3
25	Chloroethyl Ether bis 2	111444	y	n	0.020	0.053
26	Chloroform	67663	n	n	260	1100
27	Chloroisopropyl Ether bis 2	108601	n	n	1200	6500
28	Chloromethyl ether, bis	542881	y	n	0.000024	0.000029
29	Chloronaphthalene 2	91587	n	n	150	160
30	Chlorophenol 2	95578	n	n	14	15
31	Chlorophenoxy Herbicide (2,4,5,-TP) [D]	93721	n	n	10	--

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Table 40

Human Health Water Quality Criteria for Toxic Pollutants

No.	Pollutant	CAS Number	Carcinogen	Aquatic Life Criterion	Human Health Criteria for the Consumption of:	
					Water + Organism (µg/L)	Organism Only (µg/L)
[D] *The Chlorophenoxy Herbicide (2,4,5,-TP) criterion is the same as originally published in the 1976 EPA Red Book which predates the 1980 methodology and did not utilize the fish ingestion BCF approach. This same criterion value was also published in the 1986 EPA Gold Book. Human health risks are primarily from drinking water, therefore no "organism only" criterion was developed. The "water + organism" criterion is based on the Maximum Contaminant Level (MCL) established under the Safe Drinking Water Act.*						
32	Chlorophenoxy Herbicide (2,4-D) [E]	94757	n	n	100	--
[E] *The Chlorophenoxy Herbicide (2,4-D) criterion is the same as originally published in the 1976 EPA Red Book which predates the 1980 methodology and did not utilize the fish ingestion BCF approach. This same criterion value was also published in the 1986 EPA Gold Book. Human health risks are primarily from drinking water, therefore no "organism only" criterion was developed. The "water + organism" criterion is based on the Maximum Contaminant Level (MCL) established under the Safe Drinking Water Act.*						
33	Chrysene	218019	y	n	0.0013	0.0018
34	Copper [F]	7440508	n	y	1300	--
[F] *Human health risks from copper are primarily from drinking water, therefore no "organism only" criterion was developed. The "water + organism" criterion is based on the Maximum Contaminant Level (MCL) established under the Safe Drinking Water Act.*						
35	Cyanide [G]	57125	n	y	130	130
	[G] *The cyanide criterion is expressed as total cyanide (CN)/L.*					
36	DDD 4,4'	72548	y	n	0.000031	0.000031
37	DDE 4,4'	72559	y	n	0.000022	0.000022
38	DDT 4,4'	50293	y	y	0.000022	0.000022
39	Dibenz(a,h)anthracene	53703	y	n	0.0013	0.0018
40	Dichlorobenzene(m) 1,3	541731	n	n	80	96
41	Dichlorobenzene(o) 1,2	95501	n	n	110	130

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Table 40
Human Health Water Quality Criteria for Toxic Pollutants

No.	Pollutant	CAS Number	Carcinogen	Aquatic Life Criterion	Human Health Criteria for the Consumption of:	
					Water + Organism (µg/L)	Organism Only (µg/L)
42	Dichlorobenzene(p) 1,4	106467	n	n	16	19
43	Dichlorobenzidine 3,3'	91941	y	n	0.0027	0.0028
44	Dichlorobromomethane	75274	y	n	0.42	1.7
45	Dichloroethane 1,2	107062	y	n	0.35	3.7
46	Dichloroethylene 1,1	75354	n	n	230	710
47	Dichloroethylene trans 1,2	156605	n	n	120	1000
48	Dichlorophenol 2,4	120832	n	n	23	29
49	Dichloropropane 1,2	78875	y	n	0.38	1.5
50	Dichloropropene 1,3	542756	y	n	0.30	2.1
51	Dieldrin	60571	y	y	0.0000053	0.0000054
52	Diethyl Phthalate	84662	n	n	3800	4400
53	Dimethyl Phthalate	131113	n	n	84000	110000
54	Dimethylphenol 2,4	105679	n	n	76	85
55	Di-n-butyl Phthalate	84742	n	n	400	450
56	Dinitrophenol 2,4	51285	n	n	62	530
57	*Dinitrophenols*	25550587	n	n	62	530
58	Dinitrotoluene 2,4	121142	y	n	0.084	0.34
59	Dioxin (2,3,7,8-TCDD)	1746016	y	n	0.00000000051	0.00000000051

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Table 40
Human Health Water Quality Criteria for Toxic Pollutants

No.	Pollutant	CAS Number	Carcinogen	Aquatic Life Criterion	Human Health Criteria for the Consumption of:	
					Water + Organism (µg/L)	Organism Only (µg/L)
60	Diphenylhydrazine 1,2	122667	y	n	0.014	0.020
61	Endosulfan Alpha	959988	n	y	8.5	8.9
62	Endosulfan Beta	33213659	n	y	8.5	8.9
63	Endosulfan Sulfate	1031078	n	n	8.5	8.9
64	Endrin	72208	n	y	0.024	0.024
65	Endrin Aldehyde	7421934	n	n	0.030	0.030
66	Ethylbenzene	100414	n	n	160	210
67	Ethylhexyl Phthalate bis 2	117817	y	n	0.20	0.22
68	Fluoranthene	206440	n	n	14	14
69	Fluorene	86737	n	n	390	530
70	Heptachlor	76448	y	y	0.0000079	0.0000079
71	Heptachlor Epoxide	1024573	y	y	0.0000039	0.0000039
72	Hexachlorobenzene	118741	y	n	0.000029	0.000029
73	Hexachlorobutadiene	87683	y	n	0.36	1.8
74	*Hexachlorocyclo-hexane-Technical*	608731	y	n	0.0014	0.0015
75	Hexachlorocyclopentadiene	77474	n	n	30	110
76	Hexachloroethane	67721	y	n	0.29	0.33
77	Indeno(1,2,3-cd)pyrene	193395	y	n	0.0013	0.0018

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Table 40

Human Health Water Quality Criteria for Toxic Pollutants

No.	Pollutant	CAS Number	Carcinogen	Aquatic Life Criterion	Human Health Criteria for the Consumption of:	
					Water + Organism (µg/L)	Organism Only (µg/L)
78	Isophorone	78591	y	n	27	96
79	Manganese [H]	7439965	n	n	--	100
[H] *The "fish consumption only" criterion for manganese applies only to salt water and is for total manganese. This EPA recommended criterion predates the 1980 human health methodology and does not utilize the fish ingestion BCF calculation method or a fish consumption rate.*						
80	Methoxychlor [I]	72435	n	y	100	--
[I] *The human health criterion for methoxychlor is the same as originally published in the 1976 EPA Red Book which predates the 1980 methodology and did not utilize the fish ingestion BCF approach. This same criterion value was also published in the1986 EPA Gold Book. Human health risks are primarily from drinking water, therefore no "organism only" criterion was developed. The "water + organism" criterion is based on the Maximum Contaminant Level (MCL) established under the Safe Drinking Water Act.*						
81	Methyl Bromide	74839	n	n	37	150
82	Methyl-4,6-dinitrophenol 2	534521	n	n	9.2	28
83	Methylene Chloride	75092	y	n	4.3	59
84	Methylmercury (mg/kg) [J]	22967926	n	n	--	0.040 mg/kg
[J] *This value is expressed as the fish tissue concentration of methylmercury. Contaminated fish and shellfish is the primary human route of exposure to methylmercury.*						
85	Nickel	7440020	n	y	140	170
86	Nitrates [K]	14797558	n	n	10000	--
[K] *The human health criterion for nitrates is the same as originally published in the 1976 EPA Red Book which predates the 1980 methodology and did not utilize the fish ingestion BCF approach. This same criterion value was also published in the 1986 EPA Gold Book. Human health risks are primarily from drinking water, therefore no "organism only" criterion was developed. The "water + organism" criterion is based on the Maximum Contaminant Level (MCL) established under the Safe Drinking Water Act.*						
87	Nitrobenzene	98953	n	n	14	69

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Table 40
Human Health Water Quality Criteria for Toxic Pollutants

No.	Pollutant	CAS Number	Carcinogen	Aquatic Life Criterion	Human Health Criteria for the Consumption of:	
					Water + Organism (µg/L)	Organism Only (µg/L)
88	Nitrosamines	35576911	y	n	0.00079	0.046
89	Nitrosodibutylamine, N	924163	y	n	0.0050	0.022
90	Nitrosodiethylamine, N	55185	y	n	0.00079	0.046
91	Nitrosodimethylamine, N	62759	y	n	0.00068	0.30
92	Nitrosodi-n-propylamine, N	621647	y	n	0.0046	0.051
93	Nitrosodiphenylamine, N	86306	y	n	0.55	0.60
94	Nitrosopyrrolidine, N	930552	y	n	0.016	3.4
95	Pentachlorobenzene	608935	n	n	0.15	0.15
96	Pentachlorophenol	87865	y	y	0.15	0.30
97	Phenol	108952	n	n	9400	86000
98	Polychlorinated Biphenyls (PCBs) [L]	NA	y	y	0.0000064	0.0000064
[L] *This criterion applies to total PCBs (e.g. determined as Aroclors or congeners).*						
99	Pyrene	129000	n	n	290	400
100	Selenium	7782492	n	y	120	420
101	Tetrachlorobenzene, 1,2,4,5-	95943	n	n	0.11	0.11
102	Tetrachloroethane 1,1,2,2	79345	y	n	0.12	0.40
103	Tetrachloroethylene	127184	y	n	0.24	0.33
104	Thallium	7440280	n	n	0.043	0.047

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Table 40

Human Health Water Quality Criteria for Toxic Pollutants

No.	Pollutant	CAS Number	Carcinogen	Aquatic Life Criterion	Human Health Criteria for the Consumption of:	
					Water + Organism (µg/L)	Organism Only (µg/L)
105	Toluene	108883	n	n	720	1500
106	Toxaphene	8001352	y	y	0.000028	0.000028
107	Trichlorobenzene 1,2,4	120821	n	n	6.4	7.0
108	Trichloroethane 1,1,2	79005	y	n	0.44	1.6
109	Trichloroethylene	79016	y	n	1.4	3.0
110	Trichlorophenol 2,4,6	88062	y	n	0.23	0.24
111	Trichlorophenol, 2, 4, 5-	95954	n	n	330	360
112	Vinyl Chloride	75014	y	n	0.023	0.24
113	Zinc	7440666	n	y	2100	2600

Draft Rules – Edits Included

Division 41
WATER QUALITY STANDARDS: BENEFICIAL USES, POLICIES, AND CRITERIA FOR OREGON

340-041-0033
Toxic Substances

(1) Toxic Substances Narrative. Toxic substances may not be introduced above natural background levels in waters of the state in amounts, concentrations, or combinations that may be harmful, may chemically change to harmful forms in the environment, or may accumulate in sediments or bioaccumulate in aquatic life or wildlife to levels that adversely affect public health, safety, or welfare or aquatic life, wildlife or other designated beneficial uses.

(2) Aquatic Life Numeric Criteria. Levels of toxic substances in waters of the state may not exceed the applicable aquatic life criteria as defined in Table 30 under OAR 340-041-8033.

(3) Human Health Numeric Criteria. The criteria for waters of the state listed in Table 40 under OAR 340-041-8033 are established to protect Oregonians from potential adverse health effects associated with long-term exposure to toxic substances associated with consumption of fish, shellfish and water.

(4) To establish permit or other regulatory limits for toxic substances without criteria in Table 30 under OAR 340-041-8033 or Table 40 under 340-041-8033, DEQ may use public health advisories and published scientific literature. DEQ may also require or conduct bio-assessment studies to monitor the toxicity to aquatic life of complex effluents, other suspected discharges or chemical substances without numeric criteria.

(5) Establishing Site-Specific Background Pollutant Criteria: This provision is a performance-based water quality standard that results in site-specific human health water quality criteria under the conditions and procedures specified in this rule section. It addresses existing permitted discharges of a pollutant removed from the same body of water. For waterbodies where a discharge does not increase the pollutant's mass and does not increase the pollutant concentration by more than 3 percent, and where the water body meets a pollutant concentration associated with a risk level of 1 x 10-4, DEQ concludes that the pollutant concentration continues to protect human health.

(a) Definitions: As used in this section:

(A) "Background pollutant concentration" means the ambient water body concentration immediately upstream of the discharge, regardless of whether those pollutants are natural or result from upstream human activity.

(B) An “intake pollutant” is the amount of a pollutant present in waters of the state (including groundwater) as provided in subsection (C), below, at the time it is withdrawn from such waters by the discharger or other facility supplying the discharger with intake water.

(C) “Same body of water”: An intake pollutant is considered to be from the “same body of water” as the discharge if DEQ finds that the intake pollutant would have reached the vicinity of the outfall point in the receiving water within a reasonable period had the permittee not removed it. To make this finding, DEQ requires information showing that:

(i) The background concentration of the pollutant in the receiving water (excluding any amount of the pollutant in the facility's discharge) is similar to that in the intake water; and,

(ii) There is a direct hydrological connection between the intake and discharge points.

(I) DEQ may also consider other site-specific factors relevant to the transport and fate of the pollutant to make the finding in a particular case that a pollutant would or would not have reached the vicinity of the outfall point in the receiving water within a reasonable period had the permittee not removed it.

(II) An intake pollutant from groundwater may be considered to be from the “same body of water” if DEQ determines that the pollutant would have reached the vicinity of the outfall point in the receiving water within a reasonable period had the permittee not removed it. A pollutant is not from the same body of water if the groundwater contains the pollutant partially or entirely due to past or present human activity, such as industrial, commercial, or municipal operations, disposal actions, or treatment processes.

(iii) Water quality characteristics (e.g., temperature, pH, hardness) are similar in the intake and receiving waters.

(b) Applicability

(A) DEQ may establish site-specific criteria under this rule section only for carcinogenic pollutants.

(B) Site-specific criteria established under this rule section apply in the vicinity of the discharge for purposes of establishing permit limits for the specified permittee.

(C) The underlying waterbody criteria continue to apply for all other Clean Water Act programs.

(D) The site-specific background pollutant criterion will be effective when DEQ issues the permit for the specified permittee.

(E) DEQ will reevaluate any site-specific criteria developed under this procedure upon permit renewal.

(c) DEQ may establish a site-specific background pollutant criterion when all of the following conditions are met:

(A) The discharger has a currently effective NPDES permit;

(B) The mass of the pollutant discharged to the receiving waterbody does not exceed the mass of the intake pollutant from the same body of water, as defined in section (5)(a)(C) above, and therefore does not increase the total mass load of the pollutant in the receiving water body;

(C) DEQ has not assigned the discharger a TMDL wasteload allocation for the pollutant in question;

(D) The permittee uses any feasible pollutant reduction measures available and known to minimize the pollutant concentration in their discharge;

(E) The pollutant discharge has not been chemically or physically altered in a manner that causes adverse water quality impacts that would not occur if the intake pollutants were left in-stream; and,

(F) The timing and location of the pollutant discharge would not cause adverse water quality impacts that would not occur if the intake pollutant were left in-stream.

(d) The site-specific background pollutant criterion must be the most conservative of the following four values. Section (5)(e) of this rule describes the procedures for deriving these values.

(A) The projected in-stream pollutant concentration resulting from the current discharge concentration and any feasible pollutant reduction measures under (c)(D) above, after mixing with the receiving stream.

(B) The projected in-stream pollutant concentration resulting from the portion of the current discharge concentration associated with the intake pollutant mass after mixing with the receiving stream. This analysis ensures that there will be no increase in the mass of the intake pollutant in the receiving water body as required by condition (c)(B) above.

(C) The projected in-stream pollutant concentration associated with a 3 percent increase above the background pollutant concentration as calculated:

(i) For the main stem Willamette and Columbia Rivers, using 25 percent of the harmonic mean flow of the waterbody.

(ii) For all other waters, using 100 percent of the harmonic mean flow or similar critical flow value of the waterbody.

(D) A criterion concentration value representing a human health risk level of 1 x 10-4. DEQ calculates this value using EPA's human health criteria derivation equation for carcinogens (EPA

2000), a risk level of 1 x 10-4, and the same values for the remaining calculation variables that were used to derive the underlying human health criterion.

(e) Procedure to derive a site-specific human health water quality criterion to address a background pollutant:

(A) DEQ will develop a flow-weighted characterization of the relevant flows and pollutant concentrations of the receiving waterbody, effluent and all facility intake pollutant sources to determine the fate and transport of the pollutant mass.

(i) The pollutant mass in the effluent discharged to a receiving waterbody may not exceed the mass of the intake pollutant from the same body of water.

(ii) Where a facility discharges intake pollutants from multiple sources that originate from the receiving waterbody and from other waterbodies, DEQ will calculate the flow-weighted amount of each source of the pollutant in the characterization.

(iii) Where a municipal water supply system provides intake water for a facility and the supplier provides treatment of the raw water that removes an intake water pollutant, the concentration and mass of the intake water pollutant must be determined at the point where the water enters the water supplier's distribution system.

(B) Using the flow weighted characterization developed in section (5)(e)(A), DEQ will calculate the in-stream pollutant concentration following mixing of the discharge into the receiving water. DEQ will use the resultant concentration to determine the conditions in section (5)(d)(A) and (B).

(C) Using the flow-weighted characterization, DEQ will calculate the in-stream pollutant concentration based on an increase of 3 percent above background pollutant concentration. DEQ will use the resultant concentration to determine the condition in Section (5)(d)(C).

(i) For the main stem Willamette and Columbia Rivers, DEQ will use 25 percent of the harmonic mean flow of the waterbody.

(ii) For all other waters, DEQ will use 100 percent of the harmonic mean flow or similar critical flow value of the waterbody.

(D) DEQ will select the most conservative of the following values as the site-specific water quality criterion.

(i) The projected in-stream pollutant concentration described in section (5)(e)(B);

(ii) The in-stream pollutant concentration based on an increase of 3 percent above background described in section (5)(e)(C); or

(iii) A water quality criterion based on a risk level of 1 x 10-4.

(f) Calculation of water quality based effluent limits based on a site-specific background pollutant criterion:

(A) For discharges to receiving waters with a site-specific background pollutant criterion, DEQ will use the site-specific criterion in the calculation of a numeric water quality based effluent limit.

(B) DEQ will compare the calculated water quality based effluent limits to any applicable aquatic toxicity or technology based effluent limits and select the most conservative for inclusion in the permit conditions.

(g) In addition to the water quality based effluent limits described in section (5)(f), DEQ will calculate a mass-based limit where necessary to ensure that the condition described in section (5)(c)(B) is met. Where mass-based limits are included, the permit will specify how DEQ will assess compliance with mass-based effluent limitations.

(h) The permit shall include a provision requiring DEQ to consider the re-opening of the permit and re-evaluation of the site-specific background pollutant criterion if new information shows the discharger no longer meets the conditions described in subsections (5)(c) and (e).

(i) Public Notification Requirements.

(A) If DEQ proposes to grant a site-specific background pollutant criterion, it must provide public notice of the proposal and hold a public hearing. The public notice may be included in the public notification of a draft NPDES permit or other draft regulatory decision that would rely on the criterion and will also be published on DEQ's water quality standards website;

(B) DEQ will publish a list of all site-specific background pollutant criteria approved according to this rule. DEQ will add the criterion to this list within 30 days of its effective date. The list will identify the:

(i) Permittee;

(ii) Site-specific background pollutant criterion and the associated risk level;

(iii) Waterbody to which the criterion applies;

(iv) Allowable pollutant effluent limit; and,

(v) How to obtain additional information about the criterion.

(6) Arsenic Reduction Policy: The inorganic arsenic criterion for the protection of human health from the combined consumption of organisms and drinking water is 2.1 micrograms per liter. While this criterion is protective of human health and more stringent than the federal maximum contaminant level (MCL) for arsenic in drinking water, which is 10 micrograms per liter, it is based on a higher risk level than EQC used to establish other human health criteria. This higher

risk level recognizes that much of the risk is due to naturally high levels of inorganic arsenic in Oregon's waterbodies. In order to maintain the lowest human health risk from inorganic arsenic in drinking water, EQC determined that it is appropriate to adopt the following policy to limit the human contribution to that risk.

(a) It is EQC policy to reduce the addition of inorganic arsenic from new or existing anthropogenic sources to waters of the state within a surface water drinking water protection area to the maximum amount feasible. The requirements of this rule section (OAR 340-041-0033(6)) apply to sources that discharge to surface waters of the state with an ambient inorganic arsenic concentration equal to or lower than the applicable numeric inorganic arsenic criteria for the protection of human health.

(b) Definitions. As used in this section:

(A) "Add inorganic arsenic" means to discharge a net mass of inorganic arsenic from a point source (the mass of inorganic arsenic discharged minus the mass of inorganic arsenic taken into the facility from a surface water source).

(B) A "surface water drinking water protection area," means an area delineated as such by DEQ under the source water assessment program of the federal Safe Drinking Water Act, 42 U.S.C. § 300j 13. DEQ delineates these areas to protect public or community drinking water supplies that use surface water sources. These delineations are on DEQ's drinking water program Web page.

(C) "Potential to significantly increase inorganic arsenic concentrations in the public drinking water supply source water" means:

(i) A discharge will increase the concentration of inorganic arsenic in the receiving water by 10 percent or more after mixing with the harmonic mean flow of the receiving water; or

(ii) As an alternative, if sufficient data are available, the discharge will increase the concentration of inorganic arsenic in the surface water intake water of a public water system by 0.021 micrograms per liter or more based on a mass balance calculation.

(c) Following the effective date of this rule, applications for an individual NPDES permit or permit renewal received from industrial dischargers located in a surface water drinking water protection area and identified by DEQ as likely to add inorganic arsenic to the receiving water must include sufficient data to enable DEQ to determine whether:

(A) The discharge adds inorganic arsenic; and,

(B) The discharge has the potential to significantly increase inorganic arsenic concentrations in the public drinking water supply source water.

(d) Where DEQ determines that both conditions in subsection (c) of this section (6) are true, the industrial discharger must develop an inorganic arsenic reduction plan and propose all feasible measures to reduce its inorganic arsenic loading to the receiving water. The proposed plan,

including proposed measures, monitoring and reporting requirements, and a schedule for those actions, will be described in the fact sheet and incorporated into the source's NPDES permit after public comment and DEQ review and approval. In developing the plan, the source must:

(A) Identify how much it can minimize its inorganic arsenic discharge through pollution prevention measures, process changes, wastewater treatment, alternative water supply for groundwater users, or other possible pollution prevention and control measures;

(B) Evaluate the costs, feasibility and environmental impacts of the potential inorganic arsenic reduction and control measures;

(C) Estimate the predicted reduction in inorganic arsenic and the reduced human health risk expected to result from the control measures;

(D) Propose specific inorganic arsenic reduction or control measures, if feasible, and an implementation schedule; and,

(E) Propose monitoring and reporting requirements to document progress in plan implementation and the inorganic arsenic load reductions.

(e) In order to implement this section, DEQ will develop the following information and guidance within 120 days of the effective date of this rule and periodically update it as warranted by new information:

(A) A list of industrial sources or source categories, including industrial stormwater and sources covered by general permits likely to add inorganic arsenic to surface waters of the state. For industrial sources or source categories permitted under a general permit that have been identified by DEQ as likely sources of inorganic arsenic, DEQ will evaluate options for reducing inorganic arsenic during permit renewal or evaluation of Stormwater Pollution Control Plans.

(B) Quantitation limits for monitoring inorganic arsenic concentrations.

(C) Information and guidance to assist sources in estimating, according to subsection (d)(C) of this section, the reduced human health risk expected to result from inorganic arsenic control measures based on the most current EPA risk assessment.

(f) It is the policy of EQC that landowners engaged in agricultural or development practices on land where pesticides, fertilizers, or soil amendments containing arsenic are currently being or have previously been applied, implement conservation practices to minimize the erosion and runoff of inorganic arsenic to waters of the state or to a location where such material could readily migrate into waters of the state.

[NOTE: Tables 30 and 40 are found under OAR 340-041-8033]

Statutory/Other Authority: ORS 468.020, 468B.030, 468B.035 & 468B.048
Statutes/Other Implemented: ORS 468B.030, 468B.035 & 468B.048

History:
DEQ 11-2016, f. & cert. ef. 11-2-16
DEQ 1-2015, f. & cert. ef. 1-7-15
DEQ 17-2013, f. 12-23-13, cert. ef. 4-18-14
DEQ 10-2011, f. & cert. ef. 7-13-11
DEQ 8-2011, f. & cert. ef. 6-30-11
DEQ 17-2010, f. & cert. ef. 12-21-10
DEQ 3-2004, f. & cert. ef. 5-28-04
DEQ 17-2003, f. & cert. ef. 12-9-03

Division 41
WATER QUALITY STANDARDS: BENEFICIAL USES, POLICIES, AND CRITERIA FOR OREGON

340-041-8033
Division 41 Tables and Figures

(1) Table 30: Aquatic Life Water Quality Criteria for Toxic Pollutants. This table, referenced in OAR 340-041-0033, contains information about the applicability and content of the criteria contained in the table.

(2) Table 40: Human Health Water Quality Criteria for Toxic Pollutants. This table, referenced in OAR 340-041-0033, contains information about the applicability and content of the criteria contained in the table.

[ED. NOTE: To view attachments referenced in rule text, click here for PDF copy.]
Statutory/Other Authority: ORS 468.020, 468B.030, 468B.035 & 468B.048Statutes/Other
Implemented: ORS 468B.030, 468B.035 & 468B.048
History:
DEQ 13-2019, amend filed 05/16/2019, effective 05/16/2019
DEQ 13-2017, minor correction filed 10/30/2017, effective 10/30/2017
DEQ 11-2016, f. & cert. ef. 11-2-16
DEQ 1-2015, f. & cert. ef. 1-7-15

State of Oregon Department of Environmental Quality

OAR 340-041-8033

Table 30

Aquatic Life Water Quality Criteria for Toxic Pollutants

The concentration for each compound listed in Table 30 is a criterion established for waters of the state in order to protect aquatic life. The aquatic life criteria apply to waterbodies where the protection of fish and aquatic life is a designated use. All values are expressed as micrograms per liter (µg/L). Compounds are listed in alphabetical order with the corresponding information: the Chemical Abstract Service (CAS) number, whether there is a human health criterion for the pollutant (i.e. "y"= yes, "n" = no), and the associated aquatic life freshwater and saltwater acute and chronic criteria. *Italicized* pollutants are not identified as priority pollutants by EPA. Dashes in the table column indicate that there is no aquatic life criterion.

Unless otherwise noted in the table below, the acute criterion is the Criterion Maximum Concentration (CMC) applied as a one-hour average concentration, and the chronic criterion is the Criterion Continuous Concentration (CCC) applied as a 96-hour (4 days) average concentration. The CMC and CCC criteria may not be exceeded more than once every three years. Footnote A, associated with eleven pesticide pollutants in Table 30, describes the exception to the frequency and duration of the toxics criteria stated in this paragraph.

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Table 30
Aquatic Life Water Quality Criteria for Toxic Pollutants

No.	Pollutant	CAS Number	Human Health Criterion	Freshwater (µg/L)		Saltwater (µg/L)	
				Acute Criterion (CMC)	Chronic Criterion (CCC)	Acute Criterion (CMC)	Chronic Criterion (CCC)
1	Acrolein	107028	y	3.0	3.0	--	--
NOTE: These acrolein criteria are not applicable for Clean Water Act purposes until approved by EPA.							
2	Aldrin	309002	y	3 [A]	--	1.3 [A]	--
[A] *See expanded endnote A at bottom of Table 30 for alternate frequency and duration of this criterion.*							
3	*Alkalinity*		n	--	20,000 [B]	--	--

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Table 30
Aquatic Life Water Quality Criteria for Toxic Pollutants

No.	Pollutant	CAS Number	Human Health Criterion	Freshwater (µg/L)		Saltwater (µg/L)	
				Acute Criterion (CMC)	Chronic Criterion (CCC)	Acute Criterion (CMC)	Chronic Criterion (CCC)
[B] *Criterion shown is the minimum (i.e. CCC in water may not be below this value in order to protect aquatic life).*							
4	*Aluminum*	7429905	n	*See* **O, P**	*See* **O, P**	--	--
[O] *The freshwater criterion for aluminum is a function of the pH, dissolved organic carbon, and total hardness in the water column. Acute (CMC) and chronic (CCC) freshwater aluminum criteria values shall be calculated using the 2018 Aluminum Criteria Calculator (Aluminum Criteria Calculator V.2.0.xlsx), or a calculator in R or other software package using the same 1985 Guidelines calculation approach and underlying model equations as in the Aluminum Criteria Calculator V.2.0.xlsx, as defined in EPA's Final Aquatic Life Ambient Water Quality Criteria for Aluminum (EPA 822-R-18-001). See also endnote O for procedures and information.* [P] *Oregon will use analytical methods that measure the bioavailable fraction of aluminum unless total recoverable aluminum measurements are required by Federal regulations.* *Note: These aluminum criteria are not applicable for CWA purposes until approved by EPA. The currently applicable federally promulgated criteria may be found at 40 CFR 131.47.*							
5	*Ammonia*	7664417	n	*The ammonia criteria are pH and temperature dependent — See ammonia criteria Tables 30(a)-(c) at end of Table 30.*[M]	*The ammonia criteria are pH, temperature and salinity dependent. Values for saltwater criteria (total ammonia) can be calculated from the tables specified in Ambient Water Quality Criteria for Ammonia (Saltwater)—1989 (EPA 440/5-88-004)* *See DEQ's calculator for calculating saltwater ammonia criteria at: http://www.deq.state.or.us/wq/standards/toxics.htm*		

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Table 30
Aquatic Life Water Quality Criteria for Toxic Pollutants

No.	Pollutant	CAS Number	Human Health Criterion	Freshwater (µg/L)		Saltwater (µg/L)	
				Acute Criterion (CMC)	Chronic Criterion (CCC)	Acute Criterion (CMC)	Chronic Criterion (CCC)
[M] *The acute criteria in Table 30(a) apply in waterbodies where salmonids are a designated use in OAR 340-041-0101 through OAR 340-041-0340. The acute criteria in Table 30(b) apply in waterbodies where salmonids are not a designated use. The chronic criteria in Table 30(c) apply where fish and aquatic life is a designated use. It is not necessary to account for the presence or absence of salmonids or the presence of any early life stage of fish for the chronic criteria. Refer to DEQ's beneficial use website at: http://www.deq.state.or.us/wq/standards/uses.htm for additional information on salmonid beneficial use designations, including tables and maps.*							
6	Arsenic	7440382	y	340 [C, D]	150 [C, D]	69 [C, D]	36 [C, D]
[C] *Criterion is expressed in terms of "dissolved" concentrations in the water column.* [D] *Criterion is applied as total inorganic arsenic (i.e. arsenic (III) + arsenic (V)).*							
7	BHC Gamma (Lindane)	58899	y	0.95	0.08 [A]	0.16 [A]	--
[A] *See expanded endnote A at bottom of Table 30 for alternate frequency and duration of this criterion.*							
8	Cadmium	7440439	n	*See* **C, F**	*See* **C, F**	33 [C]	7.9 [C]
[C] *Criterion is expressed in terms of "dissolved" concentrations in the water column.* [F] *The freshwater criterion for this metal is expressed as a function of hardness (mg/L) in the water column. To calculate the criterion, use the formula under expanded endnote F at bottom of Table 30.*							
NOTE: The federally promulgated freshwater acute cadmium criterion in 40 CFR 131.46 remains applicable for CWA purposes until EPA approves the freshwater acute cadmium criterion specified in Table 30 Endnotes C and F. The following saltwater cadmium criteria remain applicable until EPA approves the revised criteria in Table 30: the cadmium acute (CMC) is 40 µg/L and the chronic (CCC) is 8.8 µg/L, both expressed in terms of "dissolved" concentrations in the water column.							
9	*Carbaryl*	63252	n	2.1	2.1	1.6	--
NOTE: These carbaryl criteria are not applicable for Clean Water Act purposes until approved by EPA.							
10	Chlordane	57749	y	2.4 [A]	0.0043 [A]	0.09 [A]	0.004 [A]
[A] *See expanded endnote A at bottom of Table 30 for alternate frequency and duration of this criterion.*							

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Table 30
Aquatic Life Water Quality Criteria for Toxic Pollutants

No.	Pollutant	CAS Number	Human Health Criterion	Freshwater (µg/L)		Saltwater (µg/L)	
				Acute Criterion (CMC)	Chronic Criterion (CCC)	Acute Criterion (CMC)	Chronic Criterion (CCC)
11	*Chloride*	16887006	n	860,000	230,000	--	--
12	*Chlorine*	7782505	n	19	11	13	7.5
13	*Chlorpyrifos*	2921882	n	0.083	0.041	0.011	0.0056
14	Chromium III	16065831	n	*See* **C, F**	*See* **C, F**	--	--
[C] *Criterion is expressed in terms of "dissolved" concentrations in the water column.* [F] *The freshwater criterion for this metal is expressed as a function of hardness (mg/L) in the water column. To calculate the criterion, use formula under expanded endnote F at bottom of Table 30.*							
15	Chromium VI	18540299	n	16 [C]	11 [C]	1100[C]	50[C]
[C] *Criterion is expressed in terms of "dissolved" concentrations in the water column.*							
16	Copper	7440508	y	*See* **C, N**	*See* **C, N**	4.8 [C]	3.1 [C]
[C] *Criterion is expressed in terms of "dissolved" concentrations in the water column.* [N] *The freshwater criterion for copper is a function of the concentration of ions, alkalinity, organic carbon, pH and temperature in the water column. To calculate the criterion, use the Biotic Ligand Model referenced in endnote N at the bottom of Table 30. The acute copper criterion (CMC) is applied as a one-hour average concentration. The chronic criterion (CCC) is applied as a 96-hour (4 days) average concentration. See endnote N also for procedures and information.*							
17	Cyanide	57125	y	22 [J]	5.2 [J]	1 [J]	1 [J]
[J] *This criterion is expressed as µg free cyanide (CN)/L.*							
18	DDT 4,4'	50293	y	1.1 [A, G]	0.001 [A, G]	0.13 [A, G]	0.001 [A, G]
[A] *See expanded endnote A at bottom of Table 30 for alternate frequency and duration of this criterion.* [G] *This criterion applies to DDT and its metabolites (i.e. the total concentration of DDT and its metabolites should not exceed this value).*							
19	*Demeton*	8065483	n	--	0.1	--	0.1

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Table 30
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No.	Pollutant	CAS Number	Human Health Criterion	Freshwater (µg/L)		Saltwater (µg/L)	
				Acute Criterion (CMC)	Chronic Criterion (CCC)	Acute Criterion (CMC)	Chronic Criterion (CCC)
20	*Diazinon*	333415	n	0.17	0.17	0.82	0.82
NOTE: These diazinon criteria are not applicable for Clean Water Act purposes until approved by EPA.							
21	Dieldrin	60571	y	0.24	0.056	0.71 [A]	0.0019 [A]
[A] *See expanded endnote A at bottom of Table 30 for alternate frequency and duration of this criterion.*							
22	Endosulfan	115297	n	0.22 [A, H]	0.056 [A, H]	0.034 [A, H]	0.0087 [A, H]
[A] *See expanded endnote A at bottom of Table 30 for alternate frequency and duration of this criterion.* [H] *This value is based on the criterion published in Ambient Water Quality Criteria for Endosulfan (EPA 440/5-80-046) and should be applied as the sum of alpha- and beta-endosulfan.*							
23	Endosulfan Alpha	959988	y	0.22 [A]	0.056 [A]	0.034 [A]	0.0087 [A]
[A] *See expanded endnote A at bottom of Table 30 for alternate frequency and duration of this criterion.*							
24	Endosulfan Beta	33213659	y	0.22 [A]	0.056 [A]	0.034 [A]	0.0087 [A]
[A] *See expanded endnote A at bottom of Table 30 for alternate frequency and duration of this criterion.*							
25	Endrin	72208	y	0.086	0.036	0.037 [A]	0.0023 [A]
[A] *See expanded endnote A at bottom of Table 30 for alternate frequency and duration of this criterion.*							
26	*Guthion*	86500	n	--	0.01	--	0.01
27	Heptachlor	76448	y	0.52 [A]	0.0038 [A]	0.053 [A]	0.0036 [A]
[A] *See expanded endnote A at bottom of Table 30 for alternate frequency and duration of this criterion.*							
28	Heptachlor Epoxide	1024573	y	0.52 [A]	0.0038 [A]	0.053 [A]	0.0036 [A]
[A] *See expanded endnote A at bottom of Table 30 for alternate frequency and duration of this criterion.*							
29	*Iron (total)*	7439896	n	--	1000	--	--
30	Lead	7439921	n	*See* **C , F**	*See* **C , F**	210 [C]	8.1 [C]

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Table 30
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No.	Pollutant	CAS Number	Human Health Criterion	Freshwater (µg/L)		Saltwater (µg/L)	
				Acute Criterion (CMC)	Chronic Criterion (CCC)	Acute Criterion (CMC)	Chronic Criterion (CCC)
[C] *Criterion is expressed in terms of "dissolved" concentrations in the water column.* [F] *The freshwater criterion for this metal is expressed as a function of hardness (mg/L) in the water column. To calculate the criterion, use formula under expanded endnote F at bottom of Table 30.*							
31	*Malathion*	121755	n	--	0.1	--	0.1
32	Mercury (total)	7439976	n	2.4	0.012	2.1	0.025
33	*Methoxychlor*	72435	y	--	0.03	--	0.03
34	*Mirex*	2385855	n	--	0.001	--	0.001
35	Nickel	7440020	y	*See* **C , F**	*See* **C , F**	74 [C]	8.2 [C]
[C] *Criterion is expressed in terms of "dissolved" concentrations in the water column.* [F] *The freshwater criterion for this metal is expressed as a function of hardness (mg/L) in the water column. To calculate the criterion, use formula under expanded endnote F at bottom of Table 30.*							
36	*Parathion*	56382	n	0.065	0.013	--	--
37	Pentachlorophenol	87865	y	*See* **I**	*See* **I**	13	7.9
[I] *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).*							
38	*Phosphorus Elemental*	7723140	n	--	--	--	0.1
39	Polychlorinated Biphenyls (PCBs)	NA	y	2 [K]	0.014 [K]	10 [K]	0.03 [K]
[K] *This criterion applies to total PCBs (e.g.* determined as Aroclors or congeners)							
40	Selenium	7782492	y	*See* **C , L**	4.6 [C]	290 [C]	71 [C]
[C] *Criterion is expressed in terms of "dissolved" concentrations in the water column.*							

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Table 30
Aquatic Life Water Quality Criteria for Toxic Pollutants

No.	Pollutant	CAS Number	Human Health Criterion	Freshwater (µg/L)		Saltwater (µg/L)	
				Acute Criterion (CMC)	Chronic Criterion (CCC)	Acute Criterion (CMC)	Chronic Criterion (CCC)
[L] *The CMC=(1/[(f1/CMC1)+(f2/CMC2)]µg/L) * CF 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 12.82 µg/L, respectively. See expanded endnote F for the Conversion Factor (CF) for selenium.*							
41	Silver	7440224	n	*See* **C , F**	0.10 [C]	1.9 [C]	--
[C] *Criterion is expressed in terms of "dissolved" concentrations in the water column.* [F] *The freshwater acute criterion for this metal is expressed as a function of hardness (mg/L) in the water column. To calculate the criterion, use formula under expanded endnote F at bottom of Table 30.*							
42	*Sulfide Hydrogen Sulfide*	7783064	n	--	2	--	2
43	Toxaphene	8001352	y	0.73	0.0002	0.21	0.0002
44	*Tributyltin (TBT)*	688733	n	0.46	0.072	0.42	0.0074
NOTE: The freshwater chronic and saltwater acute and chronic criteria for tributyltin are not applicable for Clean Water Act purposes until the revised Table 30 values are approved by EPA. The freshwater acute criterion is not changing and is applicable. The following tributyltin criteria remain applicable until EPA approves the revised criteria shown in Table 30: the freshwater chronic (CCC) is 0.063 µg/L, the saltwater acute (CMC) is 0.37 µg/L, and the saltwater chronic (CCC) is 0.01 µg/L.							
45	Zinc	7440666	y	*See* **C , F**	*See* **C , F**	90 [C]	81 [C]
[C] *Criterion is expressed in terms of "dissolved" concentrations in the water column.* [F] *The freshwater criterion for this metal is expressed as a function of hardness (mg/L) in the water column. To calculate the criterion, use formula under expanded endnote F at bottom of Table 30.*							

Expanded Endnotes A, F, N, O

Endnote A: Alternate Frequency and Duration for Certain Pesticides

This criterion is based on EPA recommendations issued in 1980 that were derived using guidelines that differed from EPA's 1985 Guidelines which update minimum data requirements and derivation procedures. The CMC may not be exceeded at any time and the CCC may not be exceeded based on a 24-hour average. The CMC may be applied using a one hour averaging period not to be exceeded more than once every three years, if the CMC values given in Table 30 are divided by 2 to obtain a value that is more comparable to a CMC derived using the 1985 Guidelines.

Endnote F: Equations for Hardness-Dependent Freshwater Metals Criteria and Conversion Factor Table

The freshwater criterion for this metal is expressed as dissolved with two significant figures, and is a function of hardness (mg/L) in the water column. Criteria values based on hardness are calculated using the following formulas (CMC refers to the acute criterion; CCC refers to the chronic criterion):

$$\textbf{CMC} = (\exp(m_A*[\ln(\text{hardness})] + b_A))*CF$$

$$\textbf{CCC} = (\exp(m_C*[\ln(\text{hardness})] + b_C))*CF$$

"CF" is the conversion factor used for converting a metal criterion expressed as the total recoverable fraction in the water column to a criterion expressed as the dissolved fraction in the water column.

Values for Calculating Hardness-Dependent Metals Criteria				
Chemical	**m_A**	**b_A**	**m_C**	**b_C**
Cadmium	0.9789	-3.866	0.7409	-4.719
Chromium III	0.8190	3.7256	0.8190	0.6848
Lead	1.273	-1.460	1.273	-4.705
Nickel	0.8460	2.255	0.8460	0.0584
Silver	1.72	-6.59	--	--
Zinc	0.8473	0.884	0.8473	0.884

The conversion factors (CF) below must be used in the equations above for the hardness-dependent metals in order to convert total recoverable metals criteria to dissolved metals criteria. For metals that are not hardness-dependent (i.e. arsenic, chromium VI, selenium, and silver (chronic)), or are saltwater criteria, the criterion value associated with the metal in Table 30 already reflects a dissolved criterion based on its conversion factor below.

Conversion Factor (CF) Table for Dissolved Metals				
Chemical	Freshwater		Saltwater	
	Acute	Chronic	Acute	Chronic
Arsenic	1.000	1.000	1.000	1.000
Cadmium	1.136672-[(ln hardness)(0.041838)]	1.101672-[(ln hardness)(0.041838)]	0.994	0.994
Chromium III	0.316	0.860	--	--
Chromium VI	0.982	0.962	0.993	0.993
Copper	N/A	N/A	0.83	0.83
Lead	1.46203-[(ln hardness)(0.145712)]	1.46203-[(ln hardness)(0.145712)]	0.951	0.951
Nickel	0.998	0.997	0.990	0.990
Selenium	0.996	0.922	0.998	0.998
Silver	0.85	0.85	0.85	--
Zinc	0.978	0.986	0.946	0.946

NOTE: Cadmium values m_A, m_B, and the freshwater acute CF in Endnote F are not applicable until the freshwater acute cadmium criterion in Table 30 is approved by EPA. Until then the federally promulgated freshwater acute cadmium criterion at 40 CFR 131.46 remains applicable for CWA purposes.

Endnote N: Deriving freshwater copper criteria

The freshwater copper criteria at any time are the Biotic Ligand Model (BLM) derived Instantaneous Water Quality Criteria (IWQC) output based on a concurrently measured set of model input parameter values. The Biotic Ligand Model uses multiple ambient water quality parameters to derive 1-hour acute exposure (CMC) and 96-hour chronic exposure (CCC) water quality criteria (IWQC) for copper based on the site specific water chemistry that determines the toxicity of copper to aquatic life. If measured data for one or more of the model input parameters used to derive the acute and chronic IWQC is not available, the procedures in section (1) or (2) of this endnote will be used as specified to substitute an estimate or a default value for the missing input parameter. BLM results (IWQC) based on sufficient measured input parameter data are more accurate and supersede results based on estimates or default values. The acceptable BLM software to calculate the IWQC include version 2.2.3, referenced in "Aquatic Life Ambient Freshwater Quality Criteria – Copper": EPA-822-R-07-001, February 2007, and version 2.2.4. The criteria are expressed as dissolved copper in micrograms per liter (to the nearest one-tenth).

(1) Input Parameter Substitution and Estimation Procedures to Derive BLM Criteria (IWQC)

If the measured value for any input parameter needed to derive an IWQC using the BLM is not available, DEQ will substitute an estimated input parameter value according to the procedures described in this section [Endnote N (1)]. If the data required to determine the estimated parameter value is not available, DEQ will use default values derived according to the procedures in Endnote N (2).

(a) Total recoverable concentration measurements will be substituted for dissolved concentration measurements that are not available. For alkalinity, calcium, chloride, magnesium, potassium, sodium and sulfate, total recoverable concentration measurements will be used as a direct substitute for dissolved concentration measurements. Total organic carbon (TOC) measurements will be multiplied by 0.83 to convert the TOC value to an equivalent dissolved organic carbon (DOC) value; except where sufficient TOC and DOC data are available for a site, DEQ will calculate and apply a site-specific translator in place of 0.83 to convert TOC values to DOC for use in the BLM.

(b) Alkalinity, calcium, chloride, magnesium, potassium, sodium and sulfate:
If data for any of these BLM input parameters are missing from a particular dataset, DEQ will estimate its value based on the relationship of the ion or alkalinity to specific conductance measurements for that data set using the regression analysis equations in Table 1. Specific conductance measurements must be concurrent with the other BLM input parameters dataset.

Table N-1	
Parameter	**Regression Equation**
Alkalinity	$Alk. = \exp^{(0.88 \cdot [\ln(SpC)] - 0.41)}$
Calcium	$Ca = \exp^{(0.96 \cdot [\ln(SpC)] - 2.29)}$
Chloride	$Cl = \exp^{(1.15 \cdot [\ln(SpC)] - 3.82)}$
Magnesium	$Mg = \exp^{(0.91 \cdot [\ln(SpC)] - 3.09)}$
Potassium	$K = \exp^{(0.84 \cdot [\ln(SpC)] - 3.74)}$
Sodium	$Na = \exp^{(0.86 \cdot [\ln(SpC)] - 2.22)}$
Sulfate	$SO_4 = \exp^{(1.45 \cdot [\ln(SpC)] - 5.59}$

Where, "SpC" is a measurement of specific conductance in μmhos/cm, "ln" is the natural logarithm, and "exp" is a mathematical constant that is the base of the natural logarithm.

(c) pH
If concurrent pH data is missing from the sample dataset, DEQ will use a representative pH value determined by interpolating from data available for the site or proximate monitoring locations where conditions (such as type of water body, stream flow and geology) are similar to the site. DEQ will use the available data and methods to produce the best practicable estimate of pH for the site and time for which the IWQC is being derived.

(d) Temperature
If concurrent temperature data is missing from the sample dataset, DEQ will use a monthly mean temperature based on data available for the site or proximate monitoring locations where conditions (such as type of water body and stream flow) are similar to the site.

(e) Humic Acid
If sufficient high quality data on the percentage of humic acid as a proportion of DOC is available for a site, DEQ will use that value in the BLM in place of the default value of 10% used in the model.

(2) Default Action Values

If the measured value for DOC, alkalinity, calcium, chloride, magnesium, potassium, sodium or sulfate is not available to derive an IWQC using the BLM, and the parameter value cannot be estimated as specified in section (1) above, DEQ will use a conservative input value for the missing parameter as described in this section [Endnote N (2)] to derive a default action value using the Biotic Ligand Model. The default action value will be used for Clean Water Act purposes until measured or estimated input parameter data are available to derive accurate copper criteria (IWQC) based on site specific water chemistry.

(a) The default input parameter values for DOC, alkalinity calcium, chloride, magnesium, potassium, sodium and sulfate will be the percentile value from the distribution of the high quality data available for surface waters in the region as shown in Table N-2.

Table N-2 Percentile of data distribution to be used as default value by region		
Region	**DOC** percentile	**Alkalinity and Ions** percentile
Willamette	20th	20th
Coastal	20th	20th
Cascades	20th	20th
Eastern	15th	15th
Columbia River	20th	20th

(b) The regional default values for each parameter and region will be updated periodically as additional high quality data becomes available and is added to DEQ's database.
(c) The regional default values for each parameter are available on DEQ's website.
(d) The regions listed in Table N-2 are comprised of the following EPA Level III ecoregions or waterbody:
(i) Willamette: the Willamette Valley
(ii) Coastal: Coast Range and Klamath Mountains
(iii) Cascades: Cascades
(iv) Eastern: Eastern Cascades Slopes and Foothills, Columbia Plateau, Blue Mountains, Northern Basin and Range and Snake River Plain
(v) Columbia River: Columbia River mainstem in Oregon

(3) General Policies
(a) The copper BLM derives instantaneous criteria results (IWQC) that vary at a site over time reflecting the effect of local water chemistry on copper toxicity to aquatic organisms. DEQ will apply the BLM criteria for Clean Water Act purposes to protect the water body during the most bioavailable or toxic conditions.
(b) For assessing waters of the state, DEQ will use approaches that give preference to the use of BLM criteria derived with site-specific measured input parameter data.

Endnote O: Determining freshwater aluminum criteria values

Freshwater aluminum criteria values are calculated from a concurrently measured set of Aluminum Criteria Calculator (ACC) input parameter values. The input parameter values are based on the site and time specific water chemistry that determines the toxicity of aluminum to aquatic life. If measured data for one or more of the ACC input parameters is not available, the procedures in section (1), (2), or (3) of this endnote will be used as specified to substitute an estimated or a default value for the missing input parameter or to apply default criteria derived using ecoregional data.

Criteria values based on sufficient concurrent measured input parameter data are more accurate, preferred, and supersede results based on estimates, default values or applied default ecoregional criteria values. The criteria are expressed as total recoverable in micrograms per liter (to two significant figures). Oregon will use analytical methods that measure the bioavailable fraction of aluminum unless total recoverable aluminum measurements are required by Federal regulations.

(1) Input Parameter Estimation Procedures to Derive Aluminum Criteria Values

If the measured value for one or more input parameters needed to derive an aluminum criteria value using the ACC is not available, DEQ will substitute a calculated or estimated input value according to the procedures described in this section [Endnote O (1)].

(a) DOC

DEQ will use total organic carbon (TOC) measurements to estimate DOC measurements that are not available. Total organic carbon (TOC) measurements will be multiplied by 0.83 to convert the TOC value to an equivalent dissolved organic carbon (DOC) value; except where sufficient TOC and DOC data are available for a site, DEQ will calculate and apply a site-specific translator in place of 0.83 to convert TOC values to DOC for use in the Aluminum Criteria Calculator. If neither DOC nor TOC measurements are available, substitute a default DOC value as described in Endnote O (2).

(b) Total Hardness

If total hardness is not available, DEQ will estimate total hardness by substituting dissolved hardness as an input parameter for the Aluminum Criteria Calculator. If neither total nor dissolved hardness data are available, DEQ will use the equation in Table O-1 to estimate total hardness using specific conductance. Specific conductance measurements must be concurrent with the other input parameters for the Aluminum Criteria Calculator. If total hardness cannot be estimated from concurrent data, DEQ will apply the applicable ecoregional default aluminum criterion described in Endnote O (3).

Table O-1
Equation to estimate total hardness from specific conductance

Parameter	Regression Equation
Total Hardness	$\text{Total Hardness} = \exp^{(1.050 \cdot [\ln(\text{SpC})] - 1.211)}$

Where, "SpC" is a measurement of specific conductance in µmhos/cm, "ln" is the natural logarithm, and "exp" is a mathematical constant that is the base of the natural logarithm.

(2) Applying a Default Value for DOC to Derive Aluminum Criteria Values

If concurrently measured DOC is not available to derive a criteria value using the ACC and DOC cannot be estimated as specified in Endnote O (1)(a) above, DEQ will use a conservative default DOC input value as described in this section [Endnote O (2)] to derive the criteria value. The default DOC input value will be used for Clean Water Act purposes until measured or estimated DOC input data are available to derive aluminum criteria values based on site-specific water chemistry.

(a) The default input parameter values for DOC will be the percentile value from the distribution of the high-quality data available for surface waters in the region as shown in Table O-2.

Table O-2 Percentile of data distribution to be used as default value by region	
Region	**DOC** percentile
Willamette	15th
Coastal	30th
Cascades	20th
Eastern	15th
Columbia River	10th

b) The regional default DOC values will be updated periodically as additional high-quality data become available and are added to DEQ's database.

(c) The resulting regional default input values for DOC are shown on DEQ's website.

(d) The regions listed in Table O-2 are the same as those listed in Endnote N(2)(d).

(3) Applying Aluminum Default Ecoregional Criteria

If data for pH is missing or hardness is missing and cannot be estimated as described in Endnote O (1)(b), DEQ will apply an ecoregional default aluminum criteria value.

(a) The default ecoregional acute (CMC) and chronic (CCC) criteria values will be the 10th percentile value from the distribution of all ACC outputs calculated from concurrently measured high quality input data available for Oregon surface waters by EPA Level III ecoregion with the Columbia River mainstem treated separately.

(b) The ecoregional default aluminum criteria values will be updated periodically as additional high quality data become available and are added to DEQ's database.

(c) The resulting ecoregional default aluminum criteria values are shown on DEQ's website.

(4) General Policies

(a) The ACC produces criteria values that vary at a site over time reflecting the effect of local water chemistry on aluminum toxicity to aquatic organisms. To apply the aluminum criteria for Clean Water Act purposes, criteria values based on the full range of ambient water chemistry conditions that occur at a site must be applied to protect the water body, including during conditions when aluminum is most toxic.

(b) When applying the aluminum criteria, DEQ will use approaches that give preference to the use of ACC criteria values based on concurrently measured or estimated input parameter data, as described in Endnote O (1) in the order listed, and concurrently measured aluminum data.

Table 30(a): Ammonia Acute Criteria Values (One-hour Average)—Salmonid Species Present
Temperature and pH-Dependent and expressed as Total Ammonia Nitrogen (mg/L TAN)

Criteria cannot be exceeded more than once every three years

$$Acute\ Criterion = MIN\left(\left(\frac{0.275}{1+10^{7.204-pH}}+\frac{39.0}{1+10^{pH-7.204}}\right),\left(0.7249\times\left(\frac{0.0114}{1+10^{7.204-pH}}+\frac{1.6181}{1+10^{pH-7.204}}\right)\times\left(23.12\times 10^{0.036\times(20-T)}\right)\right)\right)$$

	Temperature (°C)																
pH	**0-14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**
6.5	33	33	32	29	27	25	23	21	19	18	16	15	14	13	12	11	9.9
6.6	31	31	30	28	26	24	22	20	18	17	16	14	13	12	11	10	9.5
6.7	30	30	29	27	24	22	21	19	18	16	15	14	13	12	11	9.8	9.0
6.8	28	28	27	25	23	21	20	18	17	15	14	13	12	11	10	9.2	8.5
6.9	26	26	25	23	21	20	18	17	15	14	13	12	11	10	9.4	8.6	7.9
7.0	24	24	23	21	20	18	17	15	14	13	12	11	10	9.4	8.6	8.0	7.3
7.1	22	22	21	20	18	17	15	14	13	12	11	10	9.3	8.5	7.9	7.2	6.7
7.2	20	20	19	18	16	15	14	13	12	11	9.8	9.1	8.3	7.7	7.1	6.5	6.0
7.3	18	18	17	16	14	13	12	11	10	9.5	8.7	8.0	7.4	6.8	6.3	5.8	5.3
7.4	15	15	15	14	13	12	11	9.8	9.0	8.3	7.7	7.0	6.5	6.0	5.5	5.1	4.7
7.5	13	13	13	12	11	10	9.2	8.5	7.8	7.2	6.6	6.1	5.6	5.2	4.8	4.4	4.0
7.6	11	11	11	10	9.3	8.6	7.9	7.3	6.7	6.2	5.7	5.2	4.8	4.4	4.1	3.8	3.5
7.7	9.6	9.6	9.3	8.6	7.9	7.3	6.7	6.2	5.7	5.2	4.8	4.4	4.1	3.8	3.5	3.2	3.0
7.8	8.1	8.1	7.9	7.2	6.7	6.1	5.6	5.2	4.8	4.4	4.0	3.7	3.4	3.2	2.9	2.7	2.5
7.9	6.8	6.8	6.6	6.0	5.6	5.1	4.7	4.3	4.0	3.7	3.4	3.1	2.9	2.6	2.4	2.2	2.1
8.0	5.6	5.6	5.4	5.0	4.6	4.2	3.9	3.6	3.3	3.0	2.8	2.6	2.4	2.2	2.0	1.9	1.7
8.1	4.6	4.6	4.5	4.1	3.8	3.5	3.2	3.0	2.7	2.5	2.3	2.1	2.0	1.8	1.7	1.5	1.4
8.2	3.8	3.8	3.7	3.5	3.1	2.9	2.7	2.4	2.3	2.1	1.9	1.8	1.6	1.5	1.4	1.3	1.2
8.3	3.1	3.1	3.1	2.8	2.6	2.4	2.2	2.0	1.9	1.7	1.6	1.4	1.3	1.2	1.1	1.0	0.96
8.4	2.6	2.6	2.5	2.3	2.1	2.0	1.8	1.7	1.5	1.4	1.3	1.2	1.1	1.0	0.93	0.86	0.79
8.5	2.1	2.1	2.1	1.9	1.8	1.6	1.5	1.4	1.3	1.2	1.1	0.98	0.90	0.83	0.77	0.71	0.65
8.6	1.8	1.8	1.7	1.6	1.5	1.3	1.2	1.1	1.0	0.96	0.88	0.81	0.75	0.69	0.63	0.59	0.54
8.7	1.5	1.5	1.4	1.3	1.2	1.1	1.0	0.94	0.87	0.80	0.74	0.68	0.62	0.57	0.53	0.49	0.45
8.8	1.2	1.2	1.2	1.1	1.0	0.93	0.86	0.79	0.73	0.67	0.62	0.57	0.52	0.48	0.44	0.41	0.37
8.9	1.0	1.0	1.0	0.93	0.85	0.79	0.72	0.67	0.61	0.56	0.52	0.48	0.44	0.40	0.37	0.34	0.32
9.0	0.88	0.88	0.86	0.79	0.73	0.67	0.62	0.57	0.52	0.48	0.44	0.41	0.37	0.34	0.32	0.29	0.27

Table 30(b): Ammonia Acute Criteria Values (One-hour Average*)—Salmonid Species Absent
Temperature and pH-Dependent and expressed as Total Ammonia Nitrogen (mg/L TAN)

Criteria cannot be exceeded more than once every three years

$$Acute\ Criterion = 0.7249 \times \frac{0.0114}{1+10^{7.204-pH}} + \frac{1.6181}{1+10^{pH-7.204}} \times MIN\left(51.93, 23.12 \times 10^{0.036\times(20-T)}\right)$$

	Temperature (°C)																				
pH	**0-10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**
6.5	51	48	44	41	37	34	32	29	27	25	23	21	19	18	16	15	14	13	12	11	9.9
6.6	49	46	42	39	36	33	30	28	26	24	22	20	18	17	16	14	13	12	11	10	9.5
6.7	46	44	40	37	34	31	29	27	24	22	21	19	18	16	15	14	13	12	11	9.8	9.0
6.8	44	41	38	35	32	30	27	25	23	21	20	18	17	15	14	13	12	11	10	9.2	8.5
6.9	41	38	35	32	30	28	25	23	21	20	18	17	15	14	13	12	11	10	9.4	8.6	7.9
7.0	38	35	33	30	28	25	23	21	20	18	17	15	14	13	12	11	10	9.4	8.6	7.9	7.3
7.1	34	32	30	27	25	23	21	20	18	17	15	14	13	12	11	10	9.3	8.5	7.9	7.2	6.7
7.2	31	29	27	25	23	21	19	18	16	15	14	13	12	11	9.8	9.1	8.3	7.7	7.1	6.5	6.0
7.3	27	26	24	22	20	18	17	16	14	13	12	11	10	9.5	8.7	8.0	7.4	6.8	6.3	5.8	5.3
7.4	24	22	21	19	18	16	15	14	13	12	11	9.8	9.0	8.3	7.7	7.0	6.5	6.0	5.5	5.1	4.7
7.5	21	19	18	17	15	14	13	12	11	10	9.2	8.5	7.8	7.2	6.6	6.1	5.6	5.2	4.8	4.4	4.0
7.6	18	17	15	14	13	12	11	10	9.3	8.6	7.9	7.3	6.7	6.2	5.7	5.2	4.8	4.4	4.1	3.8	3.5
7.7	15	14	13	12	11	10	9.3	8.6	7.9	7.3	6.7	6.2	5.7	5.2	4.8	4.4	4.1	3.8	3.5	3.2	2.9
7.8	13	12	11	10	9.3	8.5	7.9	7.2	6.7	6.1	5.6	5.2	4.8	4.4	4.0	3.7	3.4	3.2	2.9	2.7	2.5
7.9	11	9.9	9.1	8.4	7.7	7.1	6.6	3.0	5.6	5.1	4.7	4.3	4.0	3.7	3.4	3.1	2.9	2.6	2.4	2.2	2.1
8.0	8.8	8.2	7.6	7.0	6.4	5.9	5.4	5.0	4.6	4.2	3.9	3.6	3.3	3.0	2.8	2.6	2.4	2.2	2.0	1.9	1.7
8.1	7.2	6.8	6.3	5.8	5.3	4.9	4.5	4.1	3.8	3.5	3.2	3.0	2.7	2.5	2.3	2.1	2.0	1.8	1.7	1.5	1.4
8.2	6.0	5.6	5.2	4.8	4.4	4.0	3.7	3.4	3.1	2.9	2.7	2.4	2.3	2.1	1.9	1.8	1.6	1.5	1.4	1.3	1.2
8.3	4.9	4.6	4.3	3.9	3.6	3.3	3.1	2.8	2.6	2.4	2.2	2.0	1.9	1.7	1.6	1.4	1.3	1.2	1.1	1.0	0.96
8.4	4.1	3.8	3.5	3.2	3.0	2.7	2.5	2.3	2.1	2.0	1.8	1.7	1.5	1.4	1.3	1.2	1.1	1.0	0.93	0.86	0.79
8.5	3.3	3.1	2.9	2.7	2.4	2.3	2.1	1.9	1.8	1.6	1.5	1.4	1.3	1.2	1.1	0.98	0.90	0.83	0.77	0.71	0.65
8.6	2.8	2.6	2.4	2.2	2.0	1.9	1.7	1.6	1.5	1.3	1.2	1.1	1.0	0.96	0.88	0.81	0.75	0.69	0.63	0.58	0.54
8.7	2.3	2.2	2.0	1.8	1.7	1.6	1.4	1.3	1.2	1.1	1.0	0.94	0.87	0.80	0.74	0.68	0.62	0.57	0.53	0.49	0.45
8.8	1.9	1.8	1.7	1.5	1.4	1.3	1.2	1.1	1.0	0.93	0.86	0.79	0.73	0.67	0.62	0.57	0.52	0.48	0.44	0.41	0.37
8.9	1.6	1.5	1.4	1.3	1.2	1.1	1.0	0.93	0.85	0.79	0.72	0.67	0.61	0.56	0.52	0.48	0.44	0.40	0.37	0.34	0.32
9.0	1.4	1.3	1.2	1.1	1.0	0.93	0.86	0.79	0.73	0.67	0.62	0.57	0.52	0.48	0.44	0.41	0.37	0.34	0.32	0.29	0.27

Table 30(c): Ammonia Chronic Criteria Values (30-day Rolling Average*)

Temperature and pH-Dependent and expressed as Total Ammonia Nitrogen (mg/L TAN)

* The highest four-day average within the 30-day averaging period must not be more than 2.5 times the chronic value

Criteria cannot be exceeded more than once every three years

$$Chronic\ Criterion = 0.8876 \times \left(\frac{0.0278}{1+10^{7.688-pH}} + \frac{1.1994}{1+10^{pH-7.688}}\right) \times \left(2.126 \times 10^{0.028\times(20-MAX(T,7))}\right)$$

	Temperature (°C)																							
pH	**0-7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**
6.5	4.9	4.6	4.3	4.1	3.8	3.6	3.3	3.1	2.9	2.8	2.6	2.4	2.3	2.1	2.0	1.9	1.8	1.6	1.5	1.5	1.4	1.3	1.2	1.1
6.6	4.8	4.5	4.3	4.0	3.8	3.5	3.3	3.1	2.9	2.7	2.5	2.4	2.2	2.1	2.0	1.8	1.7	1.6	1.5	1.4	1.3	1.3	1.2	1.1
6.7	4.8	4.5	4.2	3.9	3.7	3.5	3.2	3.0	2.8	2.7	2.5	2.3	2.2	2.1	1.9	1.8	1.7	1.6	1.5	1.4	1.3	1.2	1.2	1.1
6.8	4.6	4.4	4.1	3.8	3.6	3.4	3.2	3.0	2.8	2.6	2.4	2.3	2.1	2.0	1.9	1.8	1.7	1.6	1.5	1.4	1.3	1.2	1.1	1.1
6.9	4.5	4.2	4.0	3.7	3.5	3.3	3.1	2.9	2.7	2.5	2.4	2.2	2.1	2.0	1.8	1.7	1.6	1.5	1.4	1.3	1.2	1.2	1.1	1.0
7.0	4.4	4.1	3.8	3.6	3.4	3.2	3.0	2.8	2.6	2.4	2.3	2.2	2.0	1.9	1.8	1.7	1.6	1.5	1.4	1.3	1.2	1.1	1.1	0.99
7.1	4.2	3.9	3.7	3.5	3.2	3.0	2.8	2.7	2.5	2.3	2.2	2.1	1.9	1.8	1.7	1.6	1.5	1.4	1.3	1.2	1.2	1.1	1.0	0.95
7.2	4.0	3.7	3.5	3.3	3.1	2.9	2.7	2.5	2.4	2.2	2.1	2.0	1.8	1.7	1.6	1.5	1.4	1.3	1.3	1.2	1.1	1.0	0.96	0.90
7.3	3.8	3.5	3.3	3.1	2.9	2.7	2.6	2.4	2.2	2.1	2.0	1.8	1.7	1.6	1.5	1.4	1.3	1.3	1.2	1.1	1.0	0.97	0.91	0.85
7.4	3.5	3.3	3.1	2.9	2.7	2.5	2.4	2.2	2.1	2.0	1.8	1.7	1.6	1.5	1.4	1.3	1.3	1.2	1.1	1.0	0.96	0.90	0.85	0.79
7.5	3.2	3.0	2.8	2.7	2.5	2.3	2.2	2.1	1.9	1.8	1.7	1.6	1.5	1.4	1.3	1.2	1.2	1.1	1.0	0.95	0.89	0.83	0.78	0.73
7.6	2.9	2.8	2.6	2.4	2.3	2.1	2.0	1.9	1.8	1.6	1.5	1.4	1.4	1.3	1.2	1.1	1.1	0.98	0.92	0.86	0.81	0.76	0.71	0.67
7.7	2.6	2.4	2.3	2.2	2.0	1.9	1.8	1.7	1.6	1.5	1.4	1.3	1.2	1.1	1.1	1.0	0.94	0.88	0.83	0.78	0.73	0.68	0.64	0.60
7.8	2.3	2.2	2.1	1.9	1.8	1.7	1.6	1.5	1.4	1.3	1.2	1.2	1.1	1.0	0.95	0.89	0.84	0.79	0.74	0.69	0.65	0.61	0.57	0.53
7.9	2.1	1.9	1.8	1.7	1.6	1.5	1.4	1.3	1.2	1.2	1.1	1.0	0.95	0.89	0.84	0.79	0.74	0.69	0.65	0.61	0.57	0.53	0.50	0.47
8.0	1.8	1.7	1.6	1.5	1.4	1.3	1.2	1.1	1.1	1.0	0.94	0.88	0.83	0.78	0.73	0.68	0.64	0.60	0.56	0.53	0.50	0.44	0.44	0.41
8.1	1.5	1.5	1.4	1.3	1.2	1.1	1.1	0.99	0.92	0.87	0.81	0.76	0.71	0.67	0.63	0.59	0.55	0.52	0.49	0.46	0.43	0.40	0.38	0.35
8.2	1.3	1.2	1.2	1.1	1.0	0.96	0.90	0.84	0.79	0.74	0.70	0.65	0.61	0.57	0.54	0.50	0.47	0.44	0.42	0.39	0.37	0.34	0.32	0.30
8.3	1.1	1.1	0.99	0.93	0.87	0.82	0.76	0.72	0.67	0.63	0.59	0.55	0.52	0.49	0.46	0.43	0.40	0.38	0.35	0.33	0.31	0.29	0.27	0.26
8.4	0.95	0.89	0.84	0.79	0.74	0.69	0.65	0.61	0.57	0.53	0.50	0.47	0.44	0.41	0.39	0.36	0.34	0.32	0.30	0.28	0.26	0.25	0.23	0.22
8.5	0.80	0.75	0.71	0.67	0.62	0.58	0.55	0.51	0.48	0.45	0.42	0.40	0.37	0.35	0.33	0.31	0.29	0.27	0.25	0.24	0.22	0.21	0.20	0.18
8.6	0.68	0.64	0.60	0.56	0.53	0.49	0.46	0.43	0.41	0.38	0.36	0.33	0.31	0.29	0.28	0.26	0.24	0.23	0.21	0.20	0.19	0.18	0.16	0.15
8.7	0.57	0.54	0.51	0.47	0.44	0.42	0.39	0.37	0.34	0.32	0.30	0.28	0.27	0.25	0.23	0.22	0.21	0.19	0.18	0.17	0.16	0.15	0.14	0.13
8.8	0.49	0.46	0.43	0.40	0.38	0.35	0.33	0.31	0.29	0.27	0.26	0.24	0.23	0.21	0.20	0.19	0.17	0.16	0.15	0.14	0.13	0.13	0.12	0.11
8.9	0.42	0.39	0.37	0.34	0.32	0.30	0.28	0.27	0.25	0.23	0.22	0.21	0.19	0.18	0.17	0.16	0.15	0.14	0.13	0.12	0.12	0.11	0.10	0.09
9.0	0.36	0.34	0.32	0.30	0.28	0.26	0.24	0.23	0.21	0.20	0.19	0.18	0.17	0.16	0.15	0.14	0.13	0.12	0.11	0.11	0.10	0.09	0.09	0.08

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TABLE 40
Human Health Water Quality Criteria for Toxic Pollutants

Effective April 18, 2014

Human Health Criteria Summary

The concentration for each pollutant listed in Table 40 was derived to protect Oregonians from potential adverse health impacts associated with long-term exposure to toxic substances associated with consumption of fish, shellfish, and water. The "organism only" criteria are established to protect fish and shellfish consumption and apply to waters of the state designated for fishing. The "water + organism" criteria are established to protect the consumption of drinking water, fish, and shellfish, and apply where both fishing and domestic water supply (public and private) are designated uses. All criteria are expressed as micrograms per liter (µg/L), unless otherwise noted. Pollutants are listed in alphabetical order. Additional information includes the Chemical Abstract Service (CAS) number, whether the criterion is based on carcinogenic effects (can cause cancer in humans), and whether there is an aquatic life criterion for the pollutant (i.e. "y"= yes, "n" = no). All the human health criteria were calculated using a fish consumption rate of 175 grams per day unless otherwise noted. A fish consumption rate of 175 grams per day is approximately equal to 23 8-ounce fish meals per month. For pollutants categorized as carcinogens, values represent a cancer risk of one additional case of cancer in one million people (i.e. 10^{-6}), unless otherwise noted. All metals criteria are for total metal concentration, unless otherwise noted. Italicized pollutants represent non-priority pollutants.

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Table 40
Human Health Water Quality Criteria for Toxic Pollutants

No.	Pollutant	CAS Number	Carcinogen	Aquatic Life Criterion	Human Health Criteria for the Consumption of:	
					Water + Organism (µg/L)	Organism Only (µg/L)
1	Acenaphthene	83329	n	n	95	99
2	Acrolein	107028	n	n	0.88	0.93
3	Acrylonitrile	107131	y	n	0.018	0.025
4	Aldrin	309002	y	y	0.0000050	0.0000050
5	Anthracene	120127	n	n	2900	4000
6	Antimony	7440360	n	n	5.1	64
7	Arsenic (inorganic) [A]	7440382	y	y	2.1	2.1(freshwater) 1.0 (saltwater)
[A] *The arsenic criteria are expressed as total inorganic arsenic. The "organism only" freshwater criterion is based on a risk level of approximately 1 x 10^{-5}, and the "water + organism" criterion is based on a risk level of 1 x 10^{-4}.*						
8	Asbestos [B]	1332214	y	n	7,000,000 fibers/L	--
[B] *The human health risks from asbestos are primarily from drinking water, therefore no "organism only" criterion was developed. The "water + organism" criterion is based on the Maximum Contaminant Level (MCL) established under the Safe Drinking Water Act.*						
9	*Barium* [C]	7440393	n	n	1000	--
[C] *The human health criterion for barium is the same as originally published in the 1976 EPA Red Book which predates the 1980 methodology and did not utilize the fish ingestion BCF approach. This same criterion value was also published in the 1986 EPA Gold Book. Human health risks are primarily from drinking water, therefore no "organism only" criterion was developed. The "water + organism" criterion is based on the Maximum Contaminant Level (MCL) established under the Safe Drinking Water Act.*						
10	Benzene	71432	y	n	0.44	1.4
11	Benzidine	92875	y	n	0.000018	0.000020
12	Benz(a)anthracene	56553	y	n	0.0013	0.0018
13	Benzo(a)pyrene	50328	y	n	0.0013	0.0018

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Table 40
Human Health Water Quality Criteria for Toxic Pollutants

No.	Pollutant	CAS Number	Carcinogen	Aquatic Life Criterion	Human Health Criteria for the Consumption of:	
					Water + Organism (µg/L)	Organism Only (µg/L)
14	Benzo(b)fluoranthene 3,4	205992	y	n	0.0013	0.0018
15	Benzo(k)fluoranthene	207089	y	n	0.0013	0.0018
16	BHC Alpha	319846	y	n	0.00045	0.00049
17	BHC Beta	319857	y	n	0.0016	0.0017
18	BHC Gamma (Lindane)	58899	n	y	0.17	0.18
19	Bromoform	75252	y	n	3.3	14
20	Butylbenzyl Phthalate	85687	n	n	190	190
21	Carbon Tetrachloride	56235	y	n	0.10	0.16
22	Chlordane	57749	y	y	0.000081	0.000081
23	Chlorobenzene	108907	n	n	74	160
24	Chlorodibromomethane	124481	y	n	0.31	1.3
25	Chloroethyl Ether bis 2	111444	y	n	0.020	0.053
26	Chloroform	67663	n	n	260	1100
27	Chloroisopropyl Ether bis 2	108601	n	n	1200	6500
28	Chloromethyl ether, bis	542881	y	n	0.000024	0.000029
29	Chloronaphthalene 2	91587	n	n	150	160
30	Chlorophenol 2	95578	n	n	14	15
31	Chlorophenoxy Herbicide (2,4,5,-TP) [D]	93721	n	n	10	--

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Table 40
Human Health Water Quality Criteria for Toxic Pollutants

No.	Pollutant	CAS Number	Carcinogen	Aquatic Life Criterion	Human Health Criteria for the Consumption of:	
					Water + Organism (µg/L)	Organism Only (µg/L)
[D] *The Chlorophenoxy Herbicide (2,4,5,-TP) criterion is the same as originally published in the 1976 EPA Red Book which predates the 1980 methodology and did not utilize the fish ingestion BCF approach. This same criterion value was also published in the 1986 EPA Gold Book. Human health risks are primarily from drinking water, therefore no "organism only" criterion was developed. The "water + organism" criterion is based on the Maximum Contaminant Level (MCL) established under the Safe Drinking Water Act.*						
32	Chlorophenoxy Herbicide (2,4-D) [E]	94757	n	n	100	--
[E] *The Chlorophenoxy Herbicide (2,4-D) criterion is the same as originally published in the 1976 EPA Red Book which predates the 1980 methodology and did not utilize the fish ingestion BCF approach. This same criterion value was also published in the 1986 EPA Gold Book. Human health risks are primarily from drinking water, therefore no "organism only" criterion was developed. The "water + organism" criterion is based on the Maximum Contaminant Level (MCL) established under the Safe Drinking Water Act.*						
33	Chrysene	218019	y	n	0.0013	0.0018
34	Copper [F]	7440508	n	y	1300	--
[F] *Human health risks from copper are primarily from drinking water, therefore no "organism only" criterion was developed. The "water + organism" criterion is based on the Maximum Contaminant Level (MCL) established under the Safe Drinking Water Act.*						
35	Cyanide [G]	57125	n	y	130	130
	[G] *The cyanide criterion is expressed as total cyanide (CN)/L.*					
36	DDD 4,4'	72548	y	n	0.000031	0.000031
37	DDE 4,4'	72559	y	n	0.000022	0.000022
38	DDT 4,4'	50293	y	y	0.000022	0.000022
39	Dibenz(a,h)anthracene	53703	y	n	0.0013	0.0018
40	Dichlorobenzene(m) 1,3	541731	n	n	80	96
41	Dichlorobenzene(o) 1,2	95501	n	n	110	130

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Table 40
Human Health Water Quality Criteria for Toxic Pollutants

No.	Pollutant	CAS Number	Carcinogen	Aquatic Life Criterion	Human Health Criteria for the Consumption of:	
					Water + Organism (µg/L)	Organism Only (µg/L)
42	Dichlorobenzene(p) 1,4	106467	n	n	16	19
43	Dichlorobenzidine 3,3'	91941	y	n	0.0027	0.0028
44	Dichlorobromomethane	75274	y	n	0.42	1.7
45	Dichloroethane 1,2	107062	y	n	0.35	3.7
46	Dichloroethylene 1,1	75354	n	n	230	710
47	Dichloroethylene trans 1,2	156605	n	n	120	1000
48	Dichlorophenol 2,4	120832	n	n	23	29
49	Dichloropropane 1,2	78875	y	n	0.38	1.5
50	Dichloropropene 1,3	542756	y	n	0.30	2.1
51	Dieldrin	60571	y	y	0.0000053	0.0000054
52	Diethyl Phthalate	84662	n	n	3800	4400
53	Dimethyl Phthalate	131113	n	n	84000	110000
54	Dimethylphenol 2,4	105679	n	n	76	85
55	Di-n-butyl Phthalate	84742	n	n	400	450
56	Dinitrophenol 2,4	51285	n	n	62	530
57	*Dinitrophenols*	25550587	n	n	62	530
58	Dinitrotoluene 2,4	121142	y	n	0.084	0.34
59	Dioxin (2,3,7,8-TCDD)	1746016	y	n	0.00000000051	0.00000000051

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Table 40
Human Health Water Quality Criteria for Toxic Pollutants

No.	Pollutant	CAS Number	Carcinogen	Aquatic Life Criterion	Human Health Criteria for the Consumption of:	
					Water + Organism (µg/L)	Organism Only (µg/L)
60	Diphenylhydrazine 1,2	122667	y	n	0.014	0.020
61	Endosulfan Alpha	959988	n	y	8.5	8.9
62	Endosulfan Beta	33213659	n	y	8.5	8.9
63	Endosulfan Sulfate	1031078	n	n	8.5	8.9
64	Endrin	72208	n	y	0.024	0.024
65	Endrin Aldehyde	7421934	n	n	0.030	0.030
66	Ethylbenzene	100414	n	n	160	210
67	Ethylhexyl Phthalate bis 2	117817	y	n	0.20	0.22
68	Fluoranthene	206440	n	n	14	14
69	Fluorene	86737	n	n	390	530
70	Heptachlor	76448	y	y	0.0000079	0.0000079
71	Heptachlor Epoxide	1024573	y	y	0.0000039	0.0000039
72	Hexachlorobenzene	118741	y	n	0.000029	0.000029
73	Hexachlorobutadiene	87683	y	n	0.36	1.8
74	*Hexachlorocyclo-hexane-Technical*	608731	y	n	0.0014	0.0015
75	Hexachlorocyclopentadiene	77474	n	n	30	110
76	Hexachloroethane	67721	y	n	0.29	0.33
77	Indeno(1,2,3-cd)pyrene	193395	y	n	0.0013	0.0018

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Table 40
Human Health Water Quality Criteria for Toxic Pollutants

No.	Pollutant	CAS Number	Carcinogen	Aquatic Life Criterion	Human Health Criteria for the Consumption of:	
					Water + Organism (µg/L)	Organism Only (µg/L)
78	Isophorone	78591	y	n	27	96
79	Manganese [H]	7439965	n	n	--	100
[H] *The "fish consumption only" criterion for manganese applies only to salt water and is for total manganese. This EPA recommended criterion predates the 1980 human health methodology and does not utilize the fish ingestion BCF calculation method or a fish consumption rate.*						
80	Methoxychlor [I]	72435	n	y	100	--
[I] *The human health criterion for methoxychlor is the same as originally published in the 1976 EPA Red Book which predates the 1980 methodology and did not utilize the fish ingestion BCF approach. This same criterion value was also published in the1986 EPA Gold Book. Human health risks are primarily from drinking water, therefore no "organism only" criterion was developed. The "water + organism" criterion is based on the Maximum Contaminant Level (MCL) established under the Safe Drinking Water Act.*						
81	Methyl Bromide	74839	n	n	37	150
82	Methyl-4,6-dinitrophenol 2	534521	n	n	9.2	28
83	Methylene Chloride	75092	y	n	4.3	59
84	Methylmercury (mg/kg) [J]	22967926	n	n	--	0.040 mg/kg
[J] *This value is expressed as the fish tissue concentration of methylmercury. Contaminated fish and shellfish is the primary human route of exposure to methylmercury.*						
85	Nickel	7440020	n	y	140	170
86	Nitrates [K]	14797558	n	n	10000	--
[K] *The human health criterion for nitrates is the same as originally published in the 1976 EPA Red Book which predates the 1980 methodology and did not utilize the fish ingestion BCF approach. This same criterion value was also published in the 1986 EPA Gold Book. Human health risks are primarily from drinking water, therefore no "organism only" criterion was developed. The "water + organism" criterion is based on the Maximum Contaminant Level (MCL) established under the Safe Drinking Water Act.*						
87	Nitrobenzene	98953	n	n	14	69

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Table 40
Human Health Water Quality Criteria for Toxic Pollutants

No.	Pollutant	CAS Number	Carcinogen	Aquatic Life Criterion	Human Health Criteria for the Consumption of:	
					Water + Organism (µg/L)	Organism Only (µg/L)
88	Nitrosamines	35576911	y	n	0.00079	0.046
89	Nitrosodibutylamine, N	924163	y	n	0.0050	0.022
90	Nitrosodiethylamine, N	55185	y	n	0.00079	0.046
91	Nitrosodimethylamine, N	62759	y	n	0.00068	0.30
92	Nitrosodi-n-propylamine, N	621647	y	n	0.0046	0.051
93	Nitrosodiphenylamine, N	86306	y	n	0.55	0.60
94	Nitrosopyrrolidine, N	930552	y	n	0.016	3.4
95	Pentachlorobenzene	608935	n	n	0.15	0.15
96	Pentachlorophenol	87865	y	y	0.15	0.30
97	Phenol	108952	n	n	9400	86000
98	Polychlorinated Biphenyls (PCBs) [L]	NA	y	y	0.0000064	0.0000064
[L] *This criterion applies to total PCBs (e.g. determined as Aroclors or congeners).*						
99	Pyrene	129000	n	n	290	400
100	Selenium	7782492	n	y	120	420
101	Tetrachlorobenzene, 1,2,4,5-	95943	n	n	0.11	0.11
102	Tetrachloroethane 1,1,2,2	79345	y	n	0.12	0.40
103	Tetrachloroethylene	127184	y	n	0.24	0.33
104	Thallium	7440280	n	n	0.043	0.047

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Table 40
Human Health Water Quality Criteria for Toxic Pollutants

No.	Pollutant	CAS Number	Carcinogen	Aquatic Life Criterion	Human Health Criteria for the Consumption of:	
					Water + Organism (µg/L)	Organism Only (µg/L)
105	Toluene	108883	n	n	720	1500
106	Toxaphene	8001352	y	y	0.000028	0.000028
107	Trichlorobenzene 1,2,4	120821	n	n	6.4	7.0
108	Trichloroethane 1,1,2	79005	y	n	0.44	1.6
109	Trichloroethylene	79016	y	n	1.4	3.0
110	Trichlorophenol 2,4,6	88062	y	n	0.23	0.24
111	Trichlorophenol, 2, 4, 5-	95954	n	n	330	360
112	Vinyl Chloride	75014	y	n	0.023	0.24
113	Zinc	7440666	n	y	2100	2600

From: Finch, Bryson (ECY) <bfin461@ECY.WA.GOV>
Sent: Wednesday, April 17, 2024 7:29 AM
To: Anurag Mishra <Anurag.Mishra@Geosyntec.com>
Cc: Grant Walter <GWalter@Geosyntec.com>; Koberstein, Marla (ECY) <mkob461@ECY.WA.GOV>
Subject: RE: Question on Cu MLR Model for the Aquatic Life Toxics Criteria

I've reached out to Kevin and David on this topic last Monday but have not received a response.

Any metals that have been updated using new science or increased protection or both should have an updated hardness equation. You can find these updated hardness equations in the technical support document or rule language footnotes.

We did not review dose-response slopes for each new studies incorporated into the criteria development and believe EPA's previous assessments on slopes are satisfactory. When updating datasets with new studies, the intercept needs updated to accurately predict the criteria from hardness. You can find examples of where EPA updated hardness-based criteria using newer science but did not update the slope, only the intercept. Not updating slope but updating the intercept is common. One example is to compare the 1987 zinc criteria to the 1995 zinc updates (see attachments). EPA used new science in 1995 but did not update the slope from 1987. You will find the slopes are identical but intercepts have changed between the two published criteria docs for zinc.

-Bryson

From: Anurag Mishra <Anurag.Mishra@Geosyntec.com>
Sent: Tuesday, April 16, 2024 2:45 PM
To: Finch, Bryson (ECY) <bfin461@ECY.WA.GOV>
Cc: Grant Walter <GWalter@Geosyntec.com>; Koberstein, Marla (ECY) <mkob461@ECY.WA.GOV>
Subject: Re: Question on Cu MLR Model for the Aquatic Life Toxics Criteria

Bryson

I really appreciate your quick response. Is there a timeline for the publication of the correction?

I was also trying to calculate cadmium criteria based on hardness and looks like the intercept for the CMC and CCC formula is different than the USEPA value (2016 study), although the slope is same. Is there a more recent study that Ecology used for these equations?

Sincerely,
Anurag

From: Finch, Bryson (ECY) <bfin461@ECY.WA.GOV>
Sent: Tuesday, April 16, 2024 2:20 PM
To: Anurag Mishra <Anurag.Mishra@Geosyntec.com>
Cc: Grant Walter <GWalter@Geosyntec.com>; Koberstein, Marla (ECY) <mkob461@ECY.WA.GOV>
Subject: RE: Question on Cu MLR Model for the Aquatic Life Toxics Criteria

Hi Anurag,
I had to request these directly from David Deforest and Kevin Brix because there was a misprint in their Brix et al. 2021 article. They are planning to print a correction this year and publish a short communication that demonstrates some of the work shown in the technical support document for this rulemaking. There was a lot of collaboration between myself and these two authors on the proposed copper criteria. If it is helpful, I can forward you the email where I communicated my concern with the omission and David's response which included an explanation for the error and the pooled model equations with the intercept.

-Bryson

From: Anurag Mishra <Anurag.Mishra@Geosyntec.com>
Sent: Tuesday, April 16, 2024 2:03 PM
To: Finch, Bryson (ECY) <bfin461@ECY.WA.GOV>
Cc: Grant Walter <GWalter@Geosyntec.com>
Subject: Question on Cu MLR Model for the Aquatic Life Toxics Criteria

Hi Bryson

I am looking at the Cu MLR model for the ALTC, and I see that the model used by Ecology includes an intercept (-6.738 in equation 1, and -1.183 in equation 2). However, I could not find how these numbers were arrived at based on the paper by Brix et al., 2021. I would appreciate if you could point me to the specific part in the TSD that I might be missing.

Sincerely,
Anurag

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