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## DEPARTMENT OF ENVIRONMENTAL QUALITY

### WATER POLLUTION

#### DIVISION 41

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

#### **340-041-0002**

##### **Definitions**

Definitions in this rule apply to all basins unless context requires otherwise.

(1) "401 Water Quality Certification" means a determination made by DEQ that a dredge and fill activity, private hydropower facility, or other federally licensed or permitted activity that may result in a discharge to waters of the state has adequate terms and conditions to prevent an exceedance of water quality criteria. The federal permit in question may not be issued without this state determination in accordance with the Federal Clean Water Act, section 401 (33 USC 1341).

(2) "Ambient Stream Temperature" means the stream temperature measured at a specific time and place. The selected location for measuring stream temperature must be representative of the stream in the vicinity of the point being measured.

(3) "Anthropogenic," when used to describe "sources" or "warming," means that which results from human activity.

(4) "Applicable Criteria" means the biologically based temperature criteria in OAR 340-041-0028(4), the superseding cold water protection criteria in OAR 340-041-0028(11) or the superseding natural condition criteria in OAR 340-041-0028(8). The applicable criteria may also be site-specific criteria approved by U.S. EPA. A subbasin may have a combination of applicable temperature criteria derived from some or all of these numeric and narrative criteria.

(5) "Appropriate Reference Site or Region" means a site on the same water body or within the same basin or ecoregion that has similar habitat conditions and represents the water quality and biological community attainable within the areas of concern.

(6) "Aquatic Species" means plants or animals that live at least part of their life cycle in waters of the state.

- (7) "Basin" means a third-field hydrologic unit as identified by the U.S. Geological Survey.
- (8) "BOD" means 5-day, 20°C Biochemical Oxygen Demand.
- (9) "Cold-Water Aquatic Life" means aquatic organisms that are physiologically restricted to cold water including, but not limited to, native salmon, steelhead, mountain whitefish, char including bull trout, and trout.
- (10) "Cold Water Refugia" means those portions of a water body where or times during the diel temperature cycle when the water temperature is at least 2 degrees Celsius colder than the daily maximum temperature of the adjacent well-mixed flow of the water body.
- (11) "Commission" or "EQC" means the Oregon Environmental Quality Commission.
- (12) "Cool Water Aquatic Life" means aquatic organisms that are physiologically restricted to cool waters including, but not limited to, native sturgeon, Pacific lamprey, suckers, chub, sculpins and certain species of cyprinids (minnows.)
- (13) "Core Cold Water Habitat Use" means waters expected to maintain temperatures within the range generally considered optimal for salmon and steelhead rearing, or that are suitable for bull trout migration, foraging and sub-adult rearing that occurs during the summer. These uses are designated on the following subbasin maps set out at OAR 340-041-0101 to 340-041-0340: Figures 130A, 151A, 160A, 170A, 180A, 201A, 220A, 230A, 271A, 286A, 300A, 310A, 320A, and 340A.
- (14) "Critical Habitat" means those areas that support rare, threatened, or endangered species or serve as sensitive spawning and rearing areas for aquatic life as designated by the U.S. Fish and Wildlife Service or National Oceanic and Atmospheric Administration-Fisheries according to the Endangered Species Act (16 U.S. Code § 1531).
- (15) "Daily Mean" for dissolved oxygen means the numeric average of an adequate number of data to describe the variation in dissolved oxygen concentration throughout a day, including daily maximums and minimums. For calculating the mean, concentrations in excess of 100 percent of saturation are valued at the saturation concentration.
- (16) "Department" or "DEQ" means the Oregon State Department of Environmental Quality.
- (17) "Designated Beneficial Use" means the purpose or benefit to be derived from a water body as designated by the Water Resources Department or the Water Resources Commission.
- (18) "DO" means dissolved oxygen.
- (19) "Ecological Integrity" means the summation of chemical, physical, and biological integrity capable of supporting and maintaining a balanced, integrated, adaptive community of organisms

having a species composition, diversity, and functional organization comparable to that of the natural habitat of the region.

(20) "Epilimnion" means the seasonally stratified layer of a lake or reservoir above the metalimnion; the surface layer.

(21) "Erosion Control Plan" means a plan containing a list of best management practices to be applied during construction to control and limit soil erosion.

(22) "Estuarine Waters" means all mixed fresh and oceanic waters in estuaries or bays from the point of oceanic water intrusion inland to a line connecting the outermost points of the headlands or protective jetties.

(23) "High Quality Waters" means those waters that meet or exceed levels necessary to support the propagation of fish, shellfish and wildlife; recreation in and on the water; and other designated beneficial uses.

(24) "Hypolimnion" means the seasonally stratified layer of a lake or reservoir below the metalimnion; the bottom layer.

(25) "Industrial Waste" means any liquid, gaseous, radioactive, or solid waste substance or a combination thereof resulting from any process of industry, manufacturing, trade, or business or from the development or recovery of any natural resources.

(26) "In Lieu Fee" means a fee collected by a jurisdiction in lieu of requiring construction of onsite stormwater quality control facilities.

(27) "Intergravel Dissolved Oxygen" (IGDO) means the concentration of oxygen measured in the water within the stream bed gravels. Measurements should be taken within a limited time period before emergence of fry.

(28) "Jurisdiction" means any city or county agency in the Tualatin River and Oswego Lake subbasin that regulates land development activities within its boundaries by approving plats or site plans or issuing permits for land development.

(29) "Land Development" means any human-induced change to improved or unimproved real estate including, but not limited to, construction, installation or expansion of a building or other structure; land division; drilling; or site alteration such as land surface mining, dredging, grading, construction of earthen berms, paving, improvements for use as parking or storage, excavation or clearing.

(30) "Load Allocation" or "LA" means the portion of a receiving water's loading capacity that is attributed either to one of its existing or future nonpoint sources of pollution or to natural background sources. Load allocations are best estimates of the loading that may range from reasonably accurate estimates to gross allotments, depending on the availability of data and

appropriate techniques for predicting loading. Whenever possible, natural and nonpoint source loads should be distinguished.

(31) "Loading Capacity" or "LC" means the greatest amount of loading that a water body can receive without violating water quality standards.

(32) "Low Flow Period" means the flows in a stream resulting primarily from groundwater discharge or base flows augmented from lakes and storage projects during the driest period of the year. The dry weather period varies across the state according to climate and topography. Wherever the low flow period is indicated in Water Quality Management Plans, this period has been approximated by the inclusive months. Where applicable in a waste discharge permit, the low flow period may be further defined.

(33) "Managed Lakes" refers to lakes in which hydrology is managed by controlling the rate or timing of inflow or outflow.

(34) "Marine Waters" means all oceanic, offshore waters outside of estuaries or bays and within the territorial limits of the State of Oregon.

(35) "mg/l" or "mg/L" means milligrams per liter.

(36) "Metalimnion" means the seasonal, thermally stratified layer of a lake or reservoir that is characterized by a rapid change in temperature with depth and that effectively isolates the waters of the epilimnion from those of the hypolimnion during the period of stratification; the middle layer.

(37) "Migration Corridors" mean those waters that are predominantly used for salmon and steelhead migration during the summer and have little or no anadromous salmonid rearing in the months of July and August. Migration corridors are designated in Tables 101B and 121B and Figures 151A, 170A, 300A and 340A under OAR 340-041-0101 to 340-041-0340.

(38) "Minimum" for dissolved oxygen means the minimum recorded concentration including seasonal and diurnal minimums.

(39) "Monthly (30-day) Mean Minimum" for dissolved oxygen means the minimum of the 30 consecutive-day floating averages of the calculated daily mean dissolved oxygen concentration.

(40) "Natural Conditions" means conditions or circumstances affecting the physical, chemical, or biological integrity of a water of the state that are not influenced by past or present anthropogenic activities. Disturbances from wildfire, floods, earthquakes, volcanic or geothermal activity, wind, insect infestation and diseased vegetation are considered natural conditions.

(41) "Natural Thermal Potential" means the determination of the thermal profile of a water body using best available methods of analysis and the best available information on the site-potential

riparian vegetation, stream geomorphology, stream flows and other measures to reflect natural conditions.

(42) "Nonpoint Sources" means any source of water pollution other than a point source. Generally, a nonpoint source is a diffuse or unconfined source of pollution where wastes can either enter into waters of the state or be conveyed by the movement of water into waters of the state.

(43) "Ocean Waters" means all oceanic, offshore waters outside of estuaries or bays and within the territorial limits of Oregon.

(44) "Outstanding Resource Waters" means waters designated by the EQC where existing high quality waters constitute an outstanding state or national resource based on their extraordinary water quality or ecological values or where special water quality protection is needed to maintain critical habitat areas.

(45) "Pollution" means such contamination or other alteration of the physical, chemical, or biological properties of any waters of the state, including change in temperature, taste, color, turbidity, silt, or odor of the waters, or such discharge of any liquid, gaseous, solid, radioactive, or other substance into any water of the state that either by itself or in connection with any other substance present can reasonably be expected to create a public nuisance or render such waters harmful, detrimental, or injurious to public health, safety, or welfare; to domestic, commercial, industrial, agricultural, recreational, or other legitimate beneficial uses; or to livestock, wildlife, fish, other aquatic life or the habitat thereof.

(46) "Point Source" means a discernible, confined, and discrete conveyance including, but not limited to, a pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, vessel or other floating craft, or leachate collection system from which pollutants are or may be discharged. Point source does not include agricultural storm water discharges and return flows from irrigated agriculture.

(47) "Public Water" means the same as "waters of the state".

(48) "Public Works Project" means any land development conducted or financed by a local, state, or federal governmental body.

(49) "Reserve Capacity" means that portion of a receiving stream's loading capacity that has not been allocated to point sources or to nonpoint sources and natural background as waste load allocations or load allocations, respectively. The reserve capacity includes that loading capacity that has been set aside for a safety margin and is otherwise unallocated.

(50) "Resident Biological Community" means aquatic life expected to exist in a particular habitat when water quality standards for a specific ecoregion, basin or water body are met. This must be established by accepted biomonitoring techniques.

(51) "Salmon" means chinook, chum, coho, sockeye and pink salmon.

(52) "Salmon and Steelhead Spawning Use" means waters that are or could be used for salmon and steelhead spawning, egg incubation, and fry emergence. These uses are designated on the following subbasin maps set out at OAR 340-041-0101 to 340-041-0340: Tables 101B, and 121B, and Figures 130B, 151B, 160B, 170B, 220B, 230B, 271B, 286B, 300B, 310B, 320B, and 340B.

(53) "Salmon and Trout Rearing and Migration Use" means thermally suitable rearing habitat for salmon, steelhead, rainbow trout, and cutthroat trout as designated on subbasin maps set out at OAR 340-041-0101 to 340-041-0340: Figures 130A, 151A, 160A, 170A, 220A, 230A, 271A, 286A, 300A, 310A, 320A, and 340A.

(54) "Salmonid or Salmonids" means native salmon, trout, mountain whitefish and char including bull trout. For purposes of Oregon water quality standards, salmonid does not include brook or brown trout because they are introduced species.

(55) "Secondary Treatment" means the following depending on the context:

(a) For sewage wastes, secondary treatment means the minimum level of treatment mandated by U.S. Environmental Protection Agency regulations pursuant to Public Law 92-500.

(b) For industrial and other waste sources, secondary treatment means control equivalent to best practicable treatment.

(56) "Seven-Day Average Maximum Temperature" means a calculation of the average of the daily maximum temperatures from seven consecutive days made on a rolling basis.

(57) "Sewage" means the water-carried human or animal waste from residences, buildings, industrial establishments, or other places together with such groundwater infiltration and surface water as may be present. The admixture with sewage of industrial wastes or wastes, as defined in this rule, may also be considered "sewage" within the meaning of this division.

(58) "Short-Term Disturbance" means a temporary disturbance of six months or less when water quality standards may be violated briefly but not of sufficient duration to cause acute or chronic effects on beneficial uses.

(59) "Spatial Median" means the value that falls in the middle of a data set of multiple intergravel dissolved oxygen (IGDO) measurements taken within a spawning area. Half the samples should be greater than and half the samples should be less than the spatial median.

(60) "SS" means suspended solids.

(61) "Stormwater Quality Control Facility" means any structure or drainage way designed, constructed and maintained to collect and filter, retain, or detain surface water runoff during and

after a storm event for the purpose of water quality improvement. It may also include, but is not be limited to, existing features such as wetlands, water quality swales and ponds maintained as stormwater quality control facilities.

(62) "Subbasin" means a fourth-field hydrologic unit as identified by the U.S. Geological Survey.

(63) "Summer" means June 1 through September 30 of each calendar year.

(64) "Threatened or Endangered Species" means aquatic species listed as either threatened or endangered under the federal Endangered Species Act (16 U.S. Code § 1531 et seq. and Title 50 of the Code of Federal Regulations).

(65) "Total Maximum Daily Load (TMDL)" means the sum of the individual waste load allocations (WLAs) for point sources and load allocations (LAs) for nonpoint sources and background. If receiving water has only one point source discharger, the TMDL is the sum of that point source WLA plus the LAs for any nonpoint sources of pollution and natural background sources, tributaries, or adjacent segments. TMDLs can be expressed in terms of either mass per time, toxicity, or other appropriate measure. If Best Management Practices (BMPs) or other nonpoint source pollution controls make more stringent load allocations practicable, then wasteload allocations can be made less stringent. Thus, the TMDL process provides for nonpoint source control tradeoffs.

(66) "Toxic Substance" means those pollutants or combinations of pollutants, including disease-causing agents, that after introduction to waters of the state and upon exposure, ingestion, inhalation or assimilation either directly from the environment or indirectly by ingestion through food chains will cause death, disease, behavioral abnormalities, cancer, genetic mutations, physiological malfunctions (including malfunctions in reproduction), or physical deformations in any organism or its offspring.

(67) "Wasteload Allocation" or "WLA" means the portion of a receiving water's loading capacity allocated to one of its existing or future point sources of pollution. WLAs constitute a type of water quality-based effluent limitation.

(68) "Warm-Water Aquatic Life" means the aquatic communities that are adapted to warm-water conditions and do not contain either cold- or cool-water species.

(69) "Wastes" means sewage, industrial wastes, and all other liquid, gaseous, solid, radioactive, or other substances that may cause or tend to cause pollution of any water of the state.

(70) "Water Quality Limited" means one of the following:

(a) A receiving stream that does not meet narrative or numeric water quality criteria during the entire year or defined season even after the implementation of standard technology;

(b) A receiving stream that achieves and is expected to continue to achieve narrative or numeric water quality criteria but uses higher than standard technology to protect beneficial uses;

(c) A receiving stream for which there is insufficient information to determine whether water quality criteria are being met with higher-than-standard treatment technology or a receiving stream that would not be expected to meet water quality criteria during the entire year or defined season without higher than standard technology.

(71) "Water Quality Swale" means a natural depression or wide, shallow ditch used to temporarily store, route or filter runoff for the purpose of improving water quality.

(72) "Waters of the state" means lakes, bays, ponds, impounding reservoirs, springs, wells, rivers, streams, creeks, estuaries, marshes, inlets, canals, the Pacific Ocean within the territorial limits of the State of Oregon, and all other bodies of surface or underground waters, natural or artificial, inland or coastal, fresh or salt, public or private (except those private waters that do not combine or effect a junction with natural surface or underground waters) that are located wholly or partially within or bordering the state or within its jurisdiction.

(73) "Weekly (seven-day) Mean Minimum" for dissolved oxygen means the minimum of the seven consecutive-day floating average of the calculated daily mean dissolved oxygen concentration.

(74) "Weekly (seven-day) Minimum Mean" for dissolved oxygen means the minimum of the seven consecutive-day floating average of the daily minimum concentration. For application of the criteria, this value is the reference for diurnal minimums.

(75) "Without Detrimental Changes in the Resident Biological Community" means no loss of ecological integrity when compared to natural conditions at an appropriate reference site or region.

Stat. Auth.: ORS 468.020, 468B.010, 468B.015, 468B.035, 468B.048

Stats. Implemented: ORS 468B.035, 468B.048

Hist.: DEQ 17-2003, f. & cert. ef. 12-9-03; DEQ 3-2004, f. & cert. ef. 5-28-04; DEQ 2-2007, f. & cert. ef. 3-15-07; DEQ 3-2012, f. & cert. ef. 5-21-12

## **340-041-0007**

### **Statewide Narrative Criteria**

(1) Notwithstanding the water quality standards contained in this Division, the highest and best practicable treatment and/or control of wastes, activities, and flows must in every case be provided so as to maintain dissolved oxygen and overall water quality at the highest possible levels and water temperatures, coliform bacteria concentrations, dissolved chemical substances,

toxic materials, radioactivity, turbidities, color, odor, and other deleterious factors at the lowest possible levels.

(2) Where a less stringent natural condition of a water of the State exceeds the numeric criteria set out in this Division, the natural condition supersedes the numeric criteria and becomes the standard for that water body. However, there are special restrictions, described in OAR 340-041-0004(9)(a)(D)(iii), that may apply to discharges that affect dissolved oxygen.

**NOTE:** On August 8, 2013, the Environmental Protection Agency disapproved rule section OAR 340-041-0007(2). Consequently, section (2) is no longer effective as a water quality criterion for purposes of CWA Section 303(c) and it cannot be used for issuing certifications under CWA Section 401, permits under CWA Section 402, or total maximum daily loads under CWA section 303(d).

(3) For any new waste sources, alternatives that utilize reuse or disposal with no discharge to public waters must be given highest priority for use wherever practicable. New source discharges may be approved subject to the criteria in OAR 340-041-0004(9).

(4) No discharges of wastes to lakes or reservoirs may be allowed except as provided in section OAR 340-041-0004(9).

(5) Log handling in public waters must conform to current Commission policies and guidelines.

(6) Sand and gravel removal operations must be conducted pursuant to a permit from the Division of State Lands and separated from the active flowing stream by a watertight berm wherever physically practicable. Recirculation and reuse of process water must be required wherever practicable. Discharges or seepage or leakage losses to public waters may not cause a violation of water quality standards or adversely affect legitimate beneficial uses.

(7) Road building and maintenance activities must be conducted in a manner so as to keep waste materials out of public waters and minimize erosion of cut banks, fills, and road surfaces.

(8) In order to improve controls over nonpoint sources of pollution, federal, State, and local resource management agencies will be encouraged and assisted to coordinate planning and implementation of programs to regulate or control runoff, erosion, turbidity, stream temperature, stream flow, and the withdrawal and use of irrigation water on a basin-wide approach so as to protect the quality and beneficial uses of water and related resources. Such programs may include, but not be limited to, the following:

(a) Development of projects for storage and release of suitable quality waters to augment low stream flow;

(b) Urban runoff control to reduce erosion;

(c) Possible modification of irrigation practices to reduce or minimize adverse impacts from irrigation return flows;

(d) Stream bank erosion reduction projects; and

(e) Federal water quality restoration plans.

(9) The development of fungi or other growths having a deleterious effect on stream bottoms, fish or other aquatic life, or that are injurious to health, recreation, or industry may not be allowed;

(10) The creation of tastes or odors or toxic or other conditions that are deleterious to fish or other aquatic life or affect the potability of drinking water or the palatability of fish or shellfish may not be allowed;

(11) The formation of appreciable bottom or sludge deposits or the formation of any organic or inorganic deposits deleterious to fish or other aquatic life or injurious to public health, recreation, or industry may not be allowed;

(12) Objectionable discoloration, scum, oily sheens, or floating solids, or coating of aquatic life with oil films may not be allowed;

(13) Aesthetic conditions offensive to the human senses of sight, taste, smell, or touch may not be allowed;

(14) Radioisotope concentrations may not exceed maximum permissible concentrations (MPC's) in drinking water, edible fishes or shellfishes, wildlife, irrigated crops, livestock and dairy products, or pose an external radiation hazard;

(15) Minimum Design Criteria for Treatment and Control of Wastes. Except as provided in OAR 340-041-0101 through 340-041-0350, and subject to the implementation requirements set forth in OAR 340-041-0061, prior to discharge of any wastes from any new or modified facility to any waters of the State, such wastes must be treated and controlled in facilities designed in accordance with the following minimum criteria.

(a) In designing treatment facilities, average conditions and a normal range of variability are generally used in establishing design criteria. A facility once completed and placed in operation should operate at or near the design limit most of the time but may operate below the design criteria limit at times due to variables which are unpredictable or uncontrollable. This is particularly true for biological treatment facilities. The actual operating limits are intended to be established by permit pursuant to ORS 468.740 and recognize that the actual performance level may at times be less than the design criteria.

(A) Sewage wastes:

- (i) Effluent BOD concentrations in mg/l, divided by the dilution factor (ratio of receiving stream flow to effluent flow) may not exceed one unless otherwise approved by the Commission;
- (ii) Sewage wastes must be disinfected, after treatment, equivalent to thorough mixing with sufficient chlorine to provide a residual of at least 1 part per million after 60 minutes of contact time unless otherwise specifically authorized by permit;
- (iii) Positive protection must be provided to prevent bypassing raw or inadequately treated sewage to public waters unless otherwise approved by the Department where elimination of inflow and infiltration would be necessary but not presently practicable; and
- (iv) More stringent waste treatment and control requirements may be imposed where special conditions make such action appropriate.

(B) Industrial wastes:

- (i) After maximum practicable in-plant control, a minimum of secondary treatment or equivalent control (reduction of suspended solids and organic material where present in significant quantities, effective disinfection where bacterial organisms of public health significance are present, and control of toxic or other deleterious substances);
- (ii) Specific industrial waste treatment requirements may be determined on an individual basis in accordance with the provisions of this plan, applicable federal requirements, and the following:
  - (I) The uses that are or may likely be made of the receiving stream;
  - (II) The size and nature of flow of the receiving stream;
  - (III) The quantity and quality of wastes to be treated; and
  - (IV) The presence or absence of other sources of pollution on the same watershed.
- (iii) Where industrial, commercial, or agricultural effluents contain significant quantities of potentially toxic elements, treatment requirements may be determined utilizing appropriate bioassays;
- (iv) Industrial cooling waters containing significant heat loads must be subjected to off-stream cooling or heat recovery prior to discharge to public waters;
- (v) Positive protection must be provided to prevent bypassing of raw or inadequately treated industrial wastes to any public waters;
- (vi) Facilities must be provided to prevent and contain spills of potentially toxic or hazardous materials.

Stat. Auth.: ORS 468.020, 468B.030, 468B.035, 468B.048

Stats. Implemented: ORS 468B.030, 468B.035, 468B.048

Hist.: DEQ 17-2003, f. & cert. ef. 12-9-03; DEQ 2-2007, f. & cert. ef. 3-15-07; DEQ 10-2011, f. & cert. ef. 7-13-11; DEQ 5-2013, f. & cert. ef. 6-21-13

## **340-041-0028**

### **Temperature**

(1) Background. Water temperatures affect the biological cycles of aquatic species and are a critical factor in maintaining and restoring healthy salmonid populations throughout the State. Water temperatures are influenced by solar radiation, stream shade, ambient air temperatures, channel morphology, groundwater inflows, and stream velocity, volume, and flow. Surface water temperatures may also be warmed by anthropogenic activities such as discharging heated water, changing stream width or depth, reducing stream shading, and water withdrawals.

(2) Policy. It is the policy of the Commission to protect aquatic ecosystems from adverse warming and cooling caused by anthropogenic activities. The Commission intends to minimize the risk to cold-water aquatic ecosystems from anthropogenic warming, to encourage the restoration and protection of critical aquatic habitat, and to control extremes in temperature fluctuations due to anthropogenic activities. The Commission recognizes that some of the State's waters will, in their natural condition, not provide optimal thermal conditions at all places and at all times that salmonid use occurs. Therefore, it is especially important to minimize additional warming due to anthropogenic sources. In addition, the Commission acknowledges that control technologies, best management practices and other measures to reduce anthropogenic warming are evolving and that the implementation to meet these criteria will be an iterative process. Finally, the Commission notes that it will reconsider beneficial use designations in the event that man-made obstructions or barriers to anadromous fish passage are removed and may justify a change to the beneficial use for that water body.

(3) Purpose. The purpose of the temperature criteria in this rule is to protect designated temperature-sensitive, beneficial uses, including specific salmonid life cycle stages in waters of the State.

(4) Biologically Based Numeric Criteria. Unless superseded by the natural conditions criteria described in section (8) of this rule, or by subsequently adopted site-specific criteria approved by EPA, the temperature criteria for State waters supporting salmonid fishes are as follows:

(a) The seven-day-average maximum temperature of a stream identified as having salmon and steelhead spawning use on subbasin maps and tables set out in OAR 340-041-0101 to 340-041-0340: Tables 101B, and 121B, and Figures 130B, 151B, 160B, 170B, 220B, 230B, 271B, 286B,

300B, 310B, 320B, and 340B, may not exceed 13.0 degrees Celsius (55.4 degrees Fahrenheit) at the times indicated on these maps and tables;

(b) The seven-day-average maximum temperature of a stream identified as having core cold water habitat use on subbasin maps set out in OAR 340-041-101 to 340-041-340: Figures 130A, 151A, 160A, 170A, 180A, 201A, 220A, 230A, 271A, 286A, 300A, 310A, 320A, and 340A, may not exceed 16.0 degrees Celsius (60.8 degrees Fahrenheit);

(c) The seven-day-average maximum temperature of a stream identified as having salmon and trout rearing and migration use on subbasin maps set out at OAR 340-041-0101 to 340-041-0340: Figures 130A, 151A, 160A, 170A, 220A, 230A, 271A, 286A, 300A, 310A, 320A, and 340A, may not exceed 18.0 degrees Celsius (64.4 degrees Fahrenheit);

(d) The seven-day-average maximum temperature of a stream identified as having a migration corridor use on subbasin maps and tables OAR 340-041-0101 to 340-041-0340: Tables 101B, and 121B, and Figures 151A, 170A, 300A, and 340A, may not exceed 20.0 degrees Celsius (68.0 degrees Fahrenheit). In addition, these water bodies must have coldwater refugia that are sufficiently distributed so as to allow salmon and steelhead migration without significant adverse effects from higher water temperatures elsewhere in the water body. Finally, the seasonal thermal pattern in Columbia and Snake Rivers must reflect the natural seasonal thermal pattern;

(e) The seven-day-average maximum temperature of a stream identified as having Lahontan cutthroat trout or redband trout use on subbasin maps and tables set out in OAR 340-041-0101 to 340-041-0340: Tables 121B, 140B, 190B, and 250B, and Figures 180A, 201A, 260A and 310A may not exceed 20.0 degrees Celsius (68.0 degrees Fahrenheit);

(f) The seven-day-average maximum temperature of a stream identified as having bull trout spawning and juvenile rearing use on subbasin maps set out at OAR 340-041-0101 to 340-041-0340: Figures 130B, 151B, 160B, 170B, 180A, 201A, 260A, 310B, and 340B, may not exceed 12.0 degrees Celsius (53.6 degrees Fahrenheit). From August 15 through May 15, in bull trout spawning waters below Clear Creek and Mehlhorn reservoirs on Upper Clear Creek (Pine Subbasin), below Laurance Lake on the Middle Fork Hood River, and below Carmen reservoir on the Upper McKenzie River, there may be no more than a 0.3 degrees Celsius (0.5 Fahrenheit) increase between the water temperature immediately upstream of the reservoir and the water temperature immediately downstream of the spillway when the ambient seven-day-average maximum stream temperature is 9.0 degrees Celsius (48 degrees Fahrenheit) or greater, and no more than a 1.0 degree Celsius (1.8 degrees Fahrenheit) increase when the seven-day-average stream temperature is less than 9 degrees Celsius.

(5) Unidentified Tributaries. For waters that are not identified on the “Fish Use Designations” maps referenced in section (4) of this rule, the applicable criteria for these waters are the same criteria as is applicable to the nearest downstream water body depicted on the applicable map.

This section (5) does not apply to the “Salmon and Steelhead Spawning Use Designations” maps.

(6) Natural Lakes. Natural lakes may not be warmed by more than 0.3 degrees Celsius (0.5 degrees Fahrenheit) above the natural condition unless a greater increase would not reasonably be expected to adversely affect fish or other aquatic life. Absent a discharge or human modification that would reasonably be expected to increase temperature, DEQ will presume that the ambient temperature of a natural lake is the same as its natural thermal condition.

(7) Oceans and Bays. Except for the Columbia River above river mile 7, ocean and bay waters may not be warmed by more than 0.3 degrees Celsius (0.5 degrees Fahrenheit) above the natural condition unless a greater increase would not reasonably be expected to adversely affect fish or other aquatic life. Absent a discharge or human modification that would reasonably be expected to increase temperature, DEQ will presume that the ambient temperature of the ocean or bay is the same as its natural thermal condition.

(8) Natural Conditions Criteria. Where the department determines that the natural thermal potential of all or a portion of a water body exceeds the biologically-based criteria in section (4) of this rule, the natural thermal potential temperatures supersede the biologically-based criteria, and are deemed to be the applicable temperature criteria for that water body.

**NOTE:** On August 8, 2013, the Environmental Protection Agency disapproved rule section OAR 340-041-0028(8). Consequently, section (8) is no longer effective as a water quality criterion for purposes of CWA Section 303(c) and it cannot be used for issuing certifications under CWA Section 401, permits under CWA Section 402, or total maximum daily loads under CWA section 303(d).

(9) Cool Water Species.

(a) No increase in temperature is allowed that would reasonably be expected to impair cool water species. Waters of the State that support cool water species are identified on subbasin tables and figures set out in OAR 340-041-0101 to 340-041-0340; Tables 140B, 190B and 250B, and Figures 180A, 201A and 340A.

(b) See OAR 340-041-0185 for a basin specific criterion for the Klamath River.

(10) Borax Lake Chub. State waters in the Malheur Lake Basin supporting the Borax Lake chub may not be cooled more than 0.3 degrees Celsius (0.5 degrees Fahrenheit) below the natural condition.

(11) Protecting Cold Water.

(a) Except as described in subsection (c) of this rule, waters of the State that have summer seven-day-average maximum ambient temperatures that are colder than the biologically based criteria in section (4) of this rule, may not be warmed by more than 0.3 degrees Celsius (0.5 degrees

Fahrenheit) above the colder water ambient temperature. This provision applies to all sources taken together at the point of maximum impact where salmon, steelhead or bull trout are present.

(b) A point source that discharges into or above salmon & steelhead spawning waters that are colder than the spawning criterion, may not cause the water temperature in the spawning reach where the physical habitat for spawning exists during the time spawning through emergence use occurs, to increase more than the following amounts after complete mixing of the effluent with the river:

(A) If the rolling 60 day average maximum ambient water temperature, between the dates of spawning use as designated under subsection (4)(a) of this rule, is 10 to 12.8 degrees Celsius, the allowable increase is 0.5 Celsius above the 60 day average; or

(B) If the rolling 60 day average maximum ambient water temperature, between the dates of spawning use as designated under subsection (4)(a) of this rule, is less than 10 degrees Celsius, the allowable increase is 1.0 Celsius above the 60 day average, unless the source provides analysis showing that a greater increase will not significantly impact the survival of salmon or steelhead eggs or the timing of salmon or steelhead fry emergence from the gravels in downstream spawning reach.

(c) The cold water protection narrative criteria in subsection (a) do not apply if:

(A) There are no threatened or endangered salmonids currently inhabiting the water body;

(B) The water body has not been designated as critical habitat; and

(C) The colder water is not necessary to ensure that downstream temperatures achieve and maintain compliance with the applicable temperature criteria.

#### (12) Implementation of the Temperature Criteria.

(a) Minimum Duties. There is no duty for anthropogenic sources to reduce heating of the waters of the State below their natural condition. Similarly, each anthropogenic point and nonpoint source is responsible only for controlling the thermal effects of its own discharge or activity in accordance with its overall heat contribution. In no case may a source cause more warming than that allowed by the human use allowance provided in subsection (b) of this rule.

(b) Human Use Allowance. Insignificant additions of heat are authorized in waters that exceed the applicable temperature criteria as follows:

(A) Prior to the completion of a temperature TMDL or other cumulative effects analysis, no single NPDES point source that discharges into a temperature water quality limited water may cause the temperature of the water body to increase more than 0.3 degrees Celsius (0.5 Fahrenheit) above the applicable criteria after mixing with either twenty five (25) percent of the stream flow, or the temperature mixing zone, whichever is more restrictive; or

(B) Following a temperature TMDL or other cumulative effects analysis, waste load and load allocations will restrict all NPDES point sources and nonpoint sources to a cumulative increase of no greater than 0.3 degrees Celsius (0.5 Fahrenheit) above the applicable criteria after complete mixing in the water body, and at the point of maximum impact.

(C) Point sources must be in compliance with the additional mixing zone requirements set out in OAR 340-041-0053(2)(d).

(D) A point source in compliance with the temperature conditions of its NPDES permit is deemed in compliance with the applicable criteria.

(c) Air Temperature Exclusion. A water body that only exceeds the criteria set out in this rule when the exceedance is attributed to daily maximum air temperatures that exceed the 90th percentile value of annual maximum seven-day average maximum air temperatures calculated using at least 10 years of air temperature data, will not be listed on the section 303(d) list of impaired waters and sources will not be considered in violation of this rule.

(d) Low Flow Conditions. An exceedance of the biologically-based numeric criteria in section (4) of this rule, or an exceedance of the natural condition criteria in section (8) of this rule will not be considered a permit violation during stream flows that are less than the 7Q10 low flow condition for that water body.

(e) Other Nonpoint Sources. The department may, on a case-by-case basis, require nonpoint sources (other than forestry and agriculture), including private hydropower facilities regulated by a 401 water quality certification, that may contribute to warming of State waters beyond 0.3 degrees Celsius (0.5 degrees Fahrenheit), and are therefore designated as water-quality limited, to develop and implement a temperature management plan to achieve compliance with applicable temperature criteria or an applicable load allocation in a TMDL pursuant to OAR 340-042-0080.

(A) Each plan must ensure that the nonpoint source controls its heat load contribution to water temperatures such that the water body experiences no more than a 0.3 degrees Celsius (0.5 degree Fahrenheit) increase above the applicable criteria from all sources taken together at the maximum point of impact.

(B) Each plan must include a description of best management practices, measures, effluent trading, and control technologies (including eliminating the heat impact on the stream) that the nonpoint source intends to use to reduce its temperature effect, a monitoring plan, and a compliance schedule for undertaking each measure.

(C) The Department may periodically require a nonpoint source to revise its temperature management plan to ensure that all practical steps have been taken to mitigate or eliminate the temperature effect of the source on the water body.

(f) Compliance Methods. Anthropogenic sources may engage in thermal water quality trading in whole or in part to offset its temperature discharge, so long as the trade results in at least a net thermal loading decrease in anthropogenic warming of the water body, and does not adversely affect a threatened or endangered species. Sources may also achieve compliance, in whole or in part, by flow augmentation, hyporheic exchange flows, outfall relocation, or other measures that reduce the temperature increase caused by the discharge.

(g) Release of Stored Water. Stored cold water may be released from reservoirs to cool downstream waters in order to achieve compliance with the applicable numeric criteria. However, there can be no significant adverse impact to downstream designated beneficial uses as a result of the releases of this cold water, and the release may not contribute to violations of other water quality criteria. Where the Department determines that the release of cold water is resulting in a significant adverse impact, the Department may require the elimination or mitigation of the adverse impact.

(13) Site-Specific Criteria. The Department may establish, by separate rulemaking, alternative site-specific criteria for all or a portion of a water body that fully protects the designated use.

(a) These site-specific criteria may be set on a seasonal basis as appropriate.

(b) The Department may use, but is not limited by the following considerations when calculating site-specific criteria:

(A) Stream flow;

(B) Riparian vegetation potential;

(C) Channel morphology modifications;

(D) Cold water tributaries and groundwater;

(E) Natural physical features and geology influencing stream temperatures; and

(F) Other relevant technical data.

(c) DEQ may consider the thermal benefit of increased flow when calculating the site-specific criteria.

(d) Once established and approved by EPA, the site-specific criteria will be the applicable criteria for the water bodies affected.

[ED. NOTE: Tables referenced are available from the agency.]

Stat. Auth.: ORS 468.020, 468B.030, 468B.035 & 468B.048

Stats. Implemented: ORS 468B.030, 468B.035 & 468B.048

Hist.: DEQ 17-2003, f. & cert. ef. 12-9-03; DEQ 1-2007, f. & cert. ef. 3-14-07; DEQ 2-2007, f. & cert. ef. 3-15-07; DEQ 10-2011, f. & cert. ef. 7-13-11; DEQ 5-2013, f. & cert. ef. 6-21-13

### **340-041-0033**

#### **Toxic Substances**

**Effectiveness.** Amendments to this rule and associated revisions to Table 30 under OAR 340-041-8033 do not become applicable for purposes of ORS chapter 468B or the federal Clean Water Act until EPA approves the revisions it identifies as water quality standards according to 40 CFR 131.21 (4/27/2000).

(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 listed 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 OAR 340-041-8033, DEQ may use the guidance values in Table 31 under OAR 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  $1 \times 10^{-4}$ , 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 it not been removed by the permittee. 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 it not been removed by the permittee.

(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 it not been removed by the permittee. 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 upon DEQ issuance of 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. The procedures deriving these values are described in the sections (5)(e) of this rule.

(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  $1 \times 10^{-4}$ . DEQ calculates this value using EPA's human health criteria derivation equation for carcinogens (EPA 2000), a risk level of  $1 \times 10^{-4}$ , 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  $1 \times 10^{-4}$ .

(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.

Stat. Auth.: ORS 468.020, 468B.030, 468B.035 & 468B.048

Stats. Implemented: ORS 468B.030, 468B.035 & 468B.048

Hist.: DEQ 17-2003, f. & cert. ef. 12-9-03; DEQ 3-2004, f. & cert. ef. 5-28-04; DEQ 17-2010, f. & cert. ef. 12-21-10; DEQ 8-2011, f. & cert. ef. 6-30-11; DEQ 10-2011, f. & cert. ef. 7-13-11; DEQ 17-2013, f. 12-23-13, cert. ef. 4-18-14

### **340-041-0124**

#### **Water Quality Standards and Policies Specific to the Main Stem Snake River**

(1) pH (hydrogen ion concentration). pH values may not fall outside the following range: main stem Snake River: 7.0-9.0.

(2) Total Dissolved Solids. Guide concentration listed below may not be exceeded unless otherwise specifically authorized by DEQ upon such conditions as it may deem necessary to carry out the general intent of this plan and to protect the beneficial uses set forth in OAR 340-041-0120: main stem Snake River -- 750.0 mg/l.

Stat. Auth.: ORS 468.020, 468B.030, 468B.035 & 468B.048

Stats. Implemented: ORS 468B.030, 468B.035 & 468B.048

Hist.: DEQ 17-2003, f. & cert. ef. 12-9-03

### **340-041-0310**

#### **Beneficial Uses to Be Protected in the Umatilla Basin**

(1) Water quality in the Umatilla Basin (see Figure 1) must be managed to protect the designated beneficial uses shown in Table 310A (January 2015).

(2) Designated fish uses to be protected in the Umatilla Basin are shown in Figures 310A and 310B (November 2003, except as noted in Table 310A).

[ED. NOTE: Tables referenced are not included in rule text. [Click here for PDF copy of table\(s\).](#)]

Stat. Auth.: ORS 468.020, 468B.030, 468B.035 & 468B.048

Stats. Implemented: ORS 468B.030, 468B.035 & 468B.048

Hist.: DEQ 17-2003, f. & cert. ef. 12-9-03; DEQ 3-2012, f. & cert. ef. 5-21-12

### **340-041-0315**

#### **Water Quality Standards and Policies for this Basin**

(1) pH (hydrogen ion concentration). pH values may not fall outside the following range: all Basin streams except the main stem Columbia River and the “constructed channel” segment of the West Division Main Canal: 6.5-9.0. When more than 25 percent of ambient measurements taken between June and September are greater than pH 8.7, and as resources are available according to priorities set by DEQ, DEQ will determine whether the values higher than 8.7 are anthropogenic or natural in origin.

(2) The following criteria apply to the “constructed channel” segment of the West Division Main Canal and supersede the water quality standards in OAR 340-041-0011 through 340-041-0036 for the “constructed channel” segment of the canal. The criteria in (b) and (c) also apply to the “overflow channels” segment of the West Division Main Canal.

(a) Canal waters may not exceed the numeric criteria shown in Table 315 from the uppermost irrigation withdrawal to the end of the “constructed channel” segment of the canal.

(b) Toxic substances must not be present in canal waters in amounts likely to singularly or in combination harm the designated beneficial uses of the canal or downstream waters.

(c) Sediment load and particulate size shall not exceed levels that interfere with irrigation or the other designated beneficial uses of the canal;

(d) pH values may not fall outside the range of 4.5 to 9.0.

(3) Minimum Design Criteria for Treatment and control of Sewage Wastes in this Basin:

(a) During periods of low stream flows (approximately April 1 to October 31): Treatment resulting in monthly average effluent concentrations not to exceed 20 mg/l of BOD and 20 mg/l of SS or equivalent control;

(b) During the period of high stream flows (approximately November 1 to April 30): A minimum of secondary treatment or equivalent control and unless otherwise specifically authorized by

DEQ, operation of all waste treatment and control facilities at maximum practicable efficiency and effectiveness so as to minimize waste discharges to public waters.

[ED. NOTE: Tables referenced are not included in rule text. [Click here for PDF copy of table\(s\).](#)]

Stat. Auth.: ORS 468.020, 468B.030, 468B.035 & 468B.048

Stats. Implemented: ORS 468B.030, 468B.035 & 468B.048

Hist.: DEQ 17-2003, f. & cert. ef. 12-9-03; DEQ 2-2007, f. & cert. ef. 3-15-07; DEQ 3-2012, f. & cert. ef. 5-21-12

### **340-041-8033**

**Table 30:** Aquatic Life Water Quality Criteria for Toxic Pollutants.

**Table 31:** Aquatic Life Water Quality Guidance Values for Toxic Pollutants.

**Table 40:** Human Health Water Quality Criteria for Toxic Pollutants.

The tables listed above in this rule are referenced in the water quality standards Toxics Substances Rule under OAR 340-041-0033. See that rule for important information about the applicability and content of these tables.

**NOTE:** In January 2015, the Environmental Quality Commission adopted revisions to Table 30 that revised the aquatic life freshwater criteria for ammonia. The Table 30 version accessed below reflects the revision to the ammonia criteria including several other clarifications. **Revised Table 30 is not applicable for Clean Water Act purposes until EPA approves the revisions.**

Stat. Auth.: ORS 468.020, 468B.030, 468B.035 & 468B.048

Stats. Implemented: ORS 468B.030, 468B.035 & 468B.048

## TABLE 30: Aquatic Life Water Quality Criteria for Toxic Pollutants

*Effective April 18, 2014*

### Aquatic Life Criteria Summary

The concentration for each compound listed in Table 30 is a criterion not to be exceeded in 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 are the designated uses. All values are expressed as micrograms per liter ( $\mu\text{g/L}$ ). 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 should 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.

Table 30							
Aquatic Life Water Quality Criteria for Toxic Pollutants							
	Pollutant	CAS Number	Human Health Criterion	Freshwater ( $\mu\text{g/L}$ )		Saltwater ( $\mu\text{g/L}$ )	
				Acute Criterion (CMC)	Chronic Criterion (CCC)	Acute Criterion (CMC)	Chronic Criterion (CCC)
1	Aldrin	309002	y	3 <sup>A</sup>	--	1.3 <sup>A</sup>	--
<sup>A</sup> See expanded endnote A at bottom of Table 30 for alternate frequency and duration of this criterion.							
2	Alkalinity		n	--	20,000 <sup>B</sup>	--	--

Table 30

## Aquatic Life Water Quality Criteria for Toxic Pollutants

	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>B</b> Criterion shown is the minimum (i.e. CCC in water may not be below this value in order to protect aquatic life).							
3	Ammonia	7664417	n	Criteria are pH, temperature, and salmonid or sensitive coldwater species dependent-- See document USEPA January 1985 (Fresh Water). <sup>M</sup>	Ammonia criteria for saltwater may depend on pH and temperature. 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; <a href="http://water.epa.gov/scitech/swguidance/standards/criteria/current/index.cfm">http://water.epa.gov/scitech/swguidance/standards/criteria/current/index.cfm</a> )		
<sup>M</sup> See expanded endnote M equations at bottom of Table 30 to calculate freshwater ammonia criteria							
4	Arsenic	7440382	y	340 <sup>C, D</sup>	150 <sup>C, D</sup>	69 <sup>C, D</sup>	36 <sup>C, D</sup>
<sup>C</sup> Criterion is expressed in terms of “dissolved” concentrations in the water column. <sup>D</sup> Criterion is applied as total inorganic arsenic (i.e. arsenic (III) + arsenic (V)).							
5	BHC Gamma (Lindane)	58899	y	0.95	0.08 <sup>A</sup>	0.16 <sup>A</sup>	--
<sup>A</sup> See expanded endnote A at bottom of Table 30 for alternate frequency and duration of this criterion.							
6	Cadmium	7440439	n	See <b>E</b>	See <b>C, F</b>	40 <sup>C</sup>	8.8 <sup>C</sup>
<sup>C</sup> Criterion is expressed in terms of “dissolved” concentrations in the water column. <sup>E</sup> 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. <sup>F</sup> 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.							
7	Chlordane	57749	y	2.4 <sup>A</sup>	0.0043 <sup>A</sup>	0.09 <sup>A</sup>	0.004 <sup>A</sup>
<sup>A</sup> See expanded endnote A at bottom of Table 30 for alternate frequency and duration of this criterion.							
8	Chloride	16887006	n	860,000	230,000	--	--



Table 30

**Aquatic Life Water Quality Criteria for Toxic Pollutants**

	Pollutant	CAS Number	Human Health Criterion	Freshwater (µg/L)		Saltwater (µg/L)	
				Acute Criterion (CMC)	Chronic Criterion (CCC)	Acute Criterion (CMC)	Chronic Criterion (CCC)
19	Endosulfan Alpha	959988	y	0.22 <sup>A</sup>	0.056 <sup>A</sup>	0.034 <sup>A</sup>	0.0087 <sup>A</sup>
<sup>A</sup> See expanded endnote A at bottom of Table 30 for alternate frequency and duration of this criterion.							
20	Endosulfan Beta	33213659	y	0.22 <sup>A</sup>	0.056 <sup>A</sup>	0.034 <sup>A</sup>	0.0087 <sup>A</sup>
<sup>A</sup> See expanded endnote A at bottom of Table 30 for alternate frequency and duration of this criterion.							
21	Endrin	72208	y	0.086	0.036	0.037 <sup>A</sup>	0.0023 <sup>A</sup>
<sup>A</sup> See expanded endnote A at bottom of Table 30 for alternate frequency and duration of this criterion.							
22	Guthion	86500	n	--	0.01	--	0.01
23	Heptachlor	76448	y	0.52 <sup>A</sup>	0.0038 <sup>A</sup>	0.053 <sup>A</sup>	0.0036 <sup>A</sup>
<sup>A</sup> See expanded endnote A at bottom of Table 30 for alternate frequency and duration of this criterion.							
24	Heptachlor Epoxide	1024573	y	0.52 <sup>A</sup>	0.0038 <sup>A</sup>	0.053 <sup>A</sup>	0.0036 <sup>A</sup>
<sup>A</sup> See expanded endnote A at bottom of Table 30 for alternate frequency and duration of this criterion.							
25	Iron (total)	7439896	n	--	1000	--	--
26	Lead	7439921	n	See C , F	See C , F	210 <sup>C</sup>	8.1 <sup>C</sup>
<sup>C</sup> Criterion is expressed in terms of "dissolved" concentrations in the water column.							
<sup>F</sup> 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.							
27	Malathion	121755	n	--	0.1	--	0.1
28	Mercury (total)	7439976	n	2.4	0.012	2.1	0.025
29	Methoxychlor	72435	y	--	0.03	--	0.03
30	Mirex	2385855	n	--	0.001	--	0.001
31	Nickel	7440020	y	See C , F	See C , F	74 <sup>C</sup>	8.2 <sup>C</sup>
<sup>C</sup> Criterion is expressed in terms of "dissolved" concentrations in the water column.							
<sup>F</sup> 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.							
32	Parathion	56382	n	0.065	0.013	--	--



## Expanded Endnotes A, E, F, M

### **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: Equations for Hardness-Dependent Freshwater Metals Criteria for Cadmium Acute and Copper Acute and Chronic 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 for hardness are calculated using the following formulas (CMC refers to the acute criterion; CCC refers to the chronic criterion):

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

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

Chemical	$m_A$	$b_A$	$m_C$	$b_C$
Cadmium	1.128	-3.828	N/A	N/A
Copper	0.9422	-1.464	0.8545	-1.465

### **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 for hardness are calculated using the following formulas (CMC refers to the acute criterion; CCC refers to the chronic criterion):

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

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

“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.

Chemical	$m_A$	$b_A$	$m_C$	$b_C$
Cadmium	N/A	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	N/A	$1.101672 - [(\ln \text{hardness})(0.041838)]$	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	$1.46203 - [(\ln \text{hardness})(0.145712)]$	$1.46203 - [(\ln \text{hardness})(0.145712)]$	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

### **Endnote M: Equations for Freshwater Ammonia Calculations**

#### **Acute Criterion**

The 1-hour average concentration of un-ionized ammonia (mg/L NH<sub>3</sub>) may not exceed more often than once every three years on average, the numerical value given by:

$CMC_{NH_3} = 0.52/FT/FPH/2$  where:

*FT = temperature adjustment factor*

*FPH = pH adjustment factor*

*TCAP = temperature cap*

$$FT = 10^{0.03(20-TCAP)}; \quad TCAP \leq T \leq 30^\circ C$$

$$FT = 10^{0.03(20-T)}; \quad 0 \leq T \leq TCAP$$

$$FPH = 1 \quad 8 \leq pH \leq 9$$

$$FPH = \frac{1 + 10^{7.4-pH}}{1.25} \quad 6.5 \leq pH \leq 8$$

TCAP = 20 °C; Salmonids and other sensitive coldwater species present



TCAP = 25 °C; Salmonids and other sensitive coldwater species absent

### **Chronic Criterion**

The 4-day average concentration of un-ionized ammonia (mg/L NH<sub>3</sub>) may not exceed more often than once every three years on average, the average numerical value given by:

$$CCC_{NH_3} = 0.80/FT/FPH/RATIO$$

where FT and FPH are as above for acute criterion and:

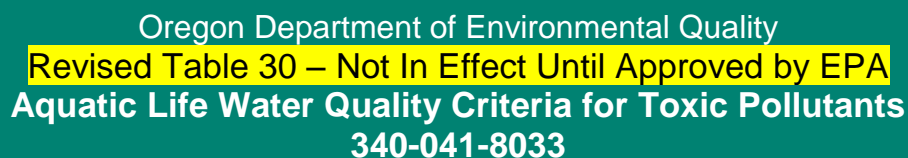
$$RATIO = 16 \quad \text{where } 7.7 \leq pH \leq 9$$

$$RATIO = 24 \times \left[ \frac{10^{7.7 - pH}}{1 + 10^{7.4 - pH}} \right] \quad \text{where } 6.5 \leq pH \leq 7.7$$

TCAP = 15 °C; Salmonids and other sensitive coldwater species present

TCAP = 20 °C; Salmonids and other sensitive coldwater species absent

[illegible]



	Pollutant	CAS Number	Human Health Criterion	Freshwater (µg/L)		Saltwater (µg/L)	
				Acute Criterion (CMC)	Chronic Criterion (CCC)	Acute Criterion (CMC)	Chronic Criterion (CCC)
3	Ammonia	7664417	n	The ammonia criteria are pH and temperature dependent — See ammonia criteria Tables 30(a)-(c) at end of Table 30. <sup>M</sup>	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)  <u>See DEQ's calculator for calculating saltwater ammonia criteria at: <a href="http://www.deq.state.or.us/wq/standards/toxics.htm">http://www.deq.state.or.us/wq/standards/toxics.htm</a>.</u>		
<p><sup>M</sup> 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: <a href="http://www.deq.state.or.us/wq/standards/uses.htm">http://www.deq.state.or.us/wq/standards/uses.htm</a> for additional information on salmonid beneficial use designations, including tables and maps.</p>							
4	Arsenic	7440382	y	340 <sup>C, D</sup>	150 <sup>C, D</sup>	69 <sup>C, D</sup>	36 <sup>C, D</sup>
<p><sup>C</sup> Criterion is expressed in terms of "dissolved" concentrations in the water column.  <sup>D</sup> Criterion is applied as total inorganic arsenic (i.e. arsenic (III) + arsenic (V)).</p>							
5	BHC Gamma (Lindane)	58899	y	0.95	0.08 <sup>A</sup>	0.16 <sup>A</sup>	--
<sup>A</sup> See expanded endnote A at bottom of Table 30 for alternate frequency and duration of this criterion.							
6	Cadmium	7440439	n	See <b>E</b>	See <b>C, F</b>	40 <sup>C</sup>	8.8 <sup>C</sup>
<p><sup>C</sup> Criterion is expressed in terms of "dissolved" concentrations in the water column.</p> <p><sup>E</sup> 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.</p> <p><sup>F</sup> 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.</p>							
7	Chlordane	57749	y	2.4 <sup>A</sup>	0.0043 <sup>A</sup>	0.09 <sup>A</sup>	0.004 <sup>A</sup>
<sup>A</sup> See expanded endnote A at bottom of Table 30 for alternate frequency and duration of this criterion.							



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**Aquatic Life Water Quality Criteria for Toxic Pollutants**  
**340-041-8033**

	Pollutant	CAS Number	Human Health Criterion	Freshwater (µg/L)		Saltwater (µg/L)	
				Acute Criterion (CMC)	Chronic Criterion (CCC)	Acute Criterion (CMC)	Chronic Criterion (CCC)
8	Chloride	16887006	n	860,000	230,000	--	--
9	Chlorine	7782505	n	19	11	13	7.5
10	Chlorpyrifos	2921882	n	0.083	0.041	0.011	0.0056
11	Chromium III	16065831	n	See C, F	See C, F	--	--
<p><sup>C</sup> Criterion is expressed in terms of "dissolved" concentrations in the water column.</p> <p><sup>F</sup> 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.</p>							
12	Chromium VI	18540299	n	16 <sup>C</sup>	11 <sup>C</sup>	1100 <sup>C</sup>	50 <sup>C</sup>
<p><sup>C</sup> Criterion is expressed in terms of "dissolved" concentrations in the water column.</p>							
13	Copper	7440508	y	See E	See E	4.8 <sup>C</sup>	3.1 <sup>C</sup>
<p><sup>C</sup> Criterion is expressed in terms of "dissolved" concentrations in the water column.</p> <p><sup>E</sup> 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.</p>							
14	Cyanide	57125	y	22 <sup>J</sup>	5.2 <sup>J</sup>	1 <sup>J</sup>	1 <sup>J</sup>
<p><sup>J</sup> This criterion is expressed as µg free cyanide (CN)/L.</p>							
15	DDT 4,4'	50293	y	1.1 <sup>A, G</sup>	0.001 <sup>A, G</sup>	0.13 <sup>A, G</sup>	0.001 <sup>A, G</sup>
<p><sup>A</sup> See expanded endnote A at bottom of Table 30 for alternate frequency and duration of this criterion.</p> <p><sup>G</sup> This criterion applies to DDT and its metabolites (i.e. the total concentration of DDT and its metabolites should not exceed this value).</p>							
16	Demeton	8065483	n	--	0.1	--	0.1
17	Dieldrin	60571	y	0.24	0.056	0.71 <sup>A</sup>	0.0019 <sup>A</sup>
<p><sup>A</sup> See expanded endnote A at bottom of Table 30 for alternate frequency and duration of this criterion.</p>							
18	Endosulfan	115297	n	0.22 <sup>A, H</sup>	0.056 <sup>A, H</sup>	0.034 <sup>A, H</sup>	0.0087 <sup>A, H</sup>
<p><sup>A</sup> See expanded endnote A at bottom of Table 30 for alternate frequency and duration of this criterion.</p> <p><sup>H</sup> 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.</p>							
19	Endosulfan Alpha	959988	y	0.22 <sup>A</sup>	0.056 <sup>A</sup>	0.034 <sup>A</sup>	0.0087 <sup>A</sup>



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	Pollutant	CAS Number	Human Health Criterion	Freshwater (µg/L)		Saltwater (µg/L)	
				Acute Criterion (CMC)	Chronic Criterion (CCC)	Acute Criterion (CMC)	Chronic Criterion (CCC)
A See expanded endnote A at bottom of Table 30 for alternate frequency and duration of this criterion.							
20	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.							
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.							
22	Guthion	86500	n	--	0.01	--	0.01
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.							
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.							
25	Iron (total)	7439896	n	--	1000	--	--
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.							
27	Malathion	121755	n	--	0.1	--	0.1
28	Mercury (total)	7439976	n	2.4	0.012	2.1	0.025
29	Methoxychlor	72435	y	--	0.03	--	0.03
30	Mirex	2385855	n	--	0.001	--	0.001
31	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.							
32	Parathion	56382	n	0.065	0.013	--	--
33	Pentachlorophenol	87865	y	See H	See H	13	7.9



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	Pollutant	CAS Number	Human Health Criterion	Freshwater (µg/L)		Saltwater (µg/L)	
				Acute Criterion (CMC)	Chronic Criterion (CCC)	Acute Criterion (CMC)	Chronic Criterion (CCC)
<sup>H</sup> 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).							
34	Phosphorus Elemental	7723140	n	--	--	--	0.1
35	Polychlorinated Biphenyls (PCBs)	NA	y	2 <sup>K</sup>	0.014 <sup>K</sup>	10 <sup>K</sup>	0.03 <sup>K</sup>
<sup>K</sup> This criterion applies to total PCBs (e.g. determined as Aroclors or congeners)							
36	Selenium	7782492	y	See <b>C</b> , <b>L</b>	4.6 <sup>C</sup>	290 <sup>C</sup>	71 <sup>C</sup>
<sup>C</sup> Criterion is expressed in terms of “dissolved” concentrations in the water column. <sup>L</sup> 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.							
37	Silver	7440224	n	See <b>C</b> , <b>F</b>	0.10 <sup>C</sup>	1.9 <sup>C</sup>	--
<sup>C</sup> Criterion is expressed in terms of “dissolved” concentrations in the water column. <sup>F</sup> 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.							
38	Sulfide Hydrogen Sulfide	7783064	n	--	2	--	2
39	Toxaphene	8001352	y	0.73	0.0002	0.21	0.0002
40	Tributyltin (TBT)	688733	n	0.46	0.063	0.37	0.01
41	Zinc	7440666	y	See <b>C</b> , <b>F</b>	See <b>C</b> , <b>F</b>	90 <sup>C</sup>	81 <sup>C</sup>
<sup>C</sup> Criterion is expressed in terms of “dissolved” concentrations in the water column. <sup>F</sup> 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

### 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: Equations for Hardness-Dependent Freshwater Metals Criteria for Cadmium Acute and Copper Acute and Chronic 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 for hardness are calculated using the following formulas (CMC refers to the acute criterion; CCC refers to the chronic criterion):

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

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

Chemical	$m_A$	$b_A$	$m_C$	$b_C$
Cadmium	1.128	-3.828	N/A	N/A
Copper	0.9422	-1.464	0.8545	-1.465

**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 for hardness are calculated using the following formulas (CMC refers to the acute criterion; CCC refers to the chronic criterion):

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

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

“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.

Chemical	m <sub>A</sub>	b <sub>A</sub>	m <sub>C</sub>	b <sub>C</sub>
Cadmium	N/A	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	N/A	$1.101672 - [(\ln \text{hardness})(0.041838)]$	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	$1.46203 - [(\ln \text{hardness})(0.145712)]$	$1.46203 - [(\ln \text{hardness})(0.145712)]$	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

## AMMONIA FRESHWATER CRITERIA TABLES

Tables (a)-(c) based on EPA April 2013 document, *Aquatic Life Ambient Water Quality Criteria for Ammonia-Freshwater* 2013,  
Office of Water (EPA 822-R-13-001)

**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

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

### 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

## AMMONIA FRESHWATER CRITERIA TABLES

Tables (a)-(c) based on EPA April 2013 document, *Aquatic Life Ambient Water Quality Criteria for Ammonia-Freshwater* 2013,  
Office of Water (EPA 822-R-13-001)

**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

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

**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

## AMMONIA FRESHWATER CRITERIA TABLES

Tables (a)-(c) based on EPA April 2013 document, *Aquatic Life Ambient Water Quality Criteria for Ammonia-Freshwater* 2013,  
Office of Water (EPA 822-R-13-001)

**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

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

### 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

**TABLE 31: Aquatic Life Water Quality Guidance Values for Toxic Pollutants**  
*Effective April 18, 2014*

**Water Quality Guidance Values Summary <sup>A</sup>**

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.

 <div> <p>Oregon Department of Environmental Quality</p> <p>Table 31</p> <p><b>Aquatic Life Water Quality Guidance Values for Toxic Pollutants</b></p> <p><b>340-041-8033</b></p> </div>						
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	
	Chlorinated Benzenes		250	50	160	129
	Chlorinated naphthalenes		1,600		7.5	
	Chloroalkyl Ethers		238,000			
26	Chloroform	67663	28,900	1,240		



# Oregon Department of Environmental Quality

Table 31

## Aquatic Life Water Quality Guidance Values for Toxic Pollutants

340-041-8033

EPA No.	Pollutant	CAS Number	Freshwater		Saltwater	
			Acute	Chronic	Acute	Chronic
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			
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	



# Oregon Department of Environmental Quality

Table 31

## Aquatic Life Water Quality Guidance Values for Toxic Pollutants

340-041-8033

EPA No.	Pollutant	CAS Number	Freshwater		Saltwater	
			Acute	Chronic	Acute	Chronic
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			
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).

# 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).

<div>  <div> <p>Oregon Department of Environmental Quality</p> <p>Table 40</p> <p><b>Human Health Water Quality Criteria for Toxic Pollutants</b></p> <p><b>340-041-8033</b></p> </div> </div>						
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



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Table 40

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No.	Pollutant	CAS Number	Carcinogen	Aquatic Life Criterion	Human Health Criteria for the Consumption of:	
					Water + Organism (µg/L)	Organism Only (µg/L)
5	Anthracene	120127	n	n	2900	4000
6	Antimony	7440360	n	n	5.1	64
7	Arsenic (inorganic) <sup>A</sup>	7440382	y	y	2.1	2.1 (freshwater) 1.0 (saltwater)
<sup>A</sup> The arsenic criteria are expressed as total inorganic arsenic. The "organism only" freshwater criterion is based on a risk level of approximately $1 \times 10^{-5}$ , and the "water + organism" criterion is based on a risk level of $1 \times 10^{-4}$ .						
8	Asbestos <sup>B</sup>	1332214	y	n	7,000,000 fibers/L	--
<sup>B</sup> 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 <sup>C</sup>	7440393	n	n	1000	--
<sup>C</sup> 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
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



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No.	Pollutant	CAS Number	Carcinogen	Aquatic Life Criterion	Human Health Criteria for the Consumption of:	
					Water + Organism (µg/L)	Organism Only (µg/L)
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) <sup>D</sup>	93721	n	n	10	--
	<sup>D</sup> 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) <sup>E</sup>	94757	n	n	100	--
	<sup>E</sup> 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 <sup>F</sup>	7440508	n	y	1300	--
	<sup>F</sup> 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 <sup>G</sup>	57125	n	y	130	130
	<sup>G</sup> 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



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No.	Pollutant	CAS Number	Carcinogen	Aquatic Life Criterion	Human Health Criteria for the Consumption of:	
					Water + Organism (µg/L)	Organism Only (µg/L)
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
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	<i>Dinitrophenols</i>	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
60	Diphenylhydrazine 1,2	122667	y	n	0.014	0.020



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No.	Pollutant	CAS Number	Carcinogen	Aquatic Life Criterion	Human Health Criteria for the Consumption of:	
					Water + Organism (µg/L)	Organism Only (µg/L)
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
78	Isophorone	78591	y	n	27	96
79	Manganese <sup>H</sup>	7439965	n	n	--	100
	<sup>H</sup> 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 <sup>I</sup>	72435	n	y	100	--



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No.	Pollutant	CAS Number	Carcinogen	Aquatic Life Criterion	Human Health Criteria for the Consumption of:	
					Water + Organism (µg/L)	Organism Only (µg/L)
	<sup>I</sup> 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 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.					
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) <sup>J</sup>	22967926	n	n	--	0.040 mg/kg
	<sup>J</sup> 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 <sup>K</sup>	14797558	n	n	10000	--
	<sup>K</sup> 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
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



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No.	Pollutant	CAS Number	Carcinogen	Aquatic Life Criterion	Human Health Criteria for the Consumption of:	
					Water + Organism (µg/L)	Organism Only (µg/L)
98	Polychlorinated Biphenyls (PCBs) <sup>L</sup>	NA	y	y	0.0000064	0.0000064
	<sup>L</sup> 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
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