EPA Listing Methodology for Oregon 2012 303(d) List

The federal Clean Water Act (CWA) Section 303(d) requires states to identify state waters where existing pollution controls are not stringent enough to achieve state water quality standards. The CWA also requires EPA to approve or disapprove the list of waters that the state has identified and if EPA disapproves this list then EPA must identify waters in the state that are not achieving the state's water quality standards. EPA must also seek public comment on the proposed listings.

EPA received Oregon's 2010 303(d) list from the Oregon Department of Environmental Quality (DEQ) on November 5, 2014. On December 21, 2016 EPA partially disapproved Oregon's 2010 303(d) list because Oregon failed to consider all readily available data and information when they developed their list. As required by 40 CFR 130.7(d)(2), EPA developed a list of waters that are not achieving Oregon's water quality standards. Below is the methodology that EPA used to assess water quality data and information for compliance with Oregon's water quality standards.

EPA began the list development process by reviewing from Oregon DEQ's database which includes data collected by DEQ and data collected by Watershed/Volunteer groups. Only A and A+ Quality Assurance/Quality Control (QA/QC) status data were used. A+ status data is data of known quality collected by DEQ that meets QC limits established in the Quality Assurance Project Plan. A status data is data of known quality submitted by entities outside of DEQ that meets QC limits established in a DEQ-approved QAPP. EPA also gathered data from its own STORET (Storage and Retrieval) data warehouse, from the U.S. Geological Survey (USGS) water data repository, the Army Corps of Engineers, and from other data sources. In general, EPA reviewed data collected from May 1, 2010, through September 30, 2014, from all sources (unless otherwise noted under the parameter specific examples). In conducting its assessment, EPA reviewed Oregon's water quality standards in Oregon Administrative Rules (OAR) Chapter 340 Division 41 and Oregon's 303(d) list assessment methodology. Standards that have been approved by EPA were used for list development.

In developing its list of impaired waters, EPA utilized Oregon's 2012 assessment methodology, which is based on federal regulations and guidance, for parameters addressed by Oregon's methodology.[1] For parameters not included in Oregon's methodology (fine sediment, for example), EPA utilized methodologies that were consistent with federal regulations and guidance and based on scientific literature or methodologies utilized by other states. In this document, EPA is including methodologies only for parameters for which EPA conducted an assessment.

[1] Methodology for Oregon's 2012 Water Quality Report and List of Water Quality Limited Waters. Oregon Department of Environmental Quality, October 14, 2014.

PARAMETER: Aquatic Weeds or Algae

BENEFICIAL USES AFFECTED: Domestic and Industrial Water Supply, Irrigation, Livestock Watering, Fish and Aquatic Life, Fishing, Boating, Water Contact Recreation, Aesthetic Quality

NARRATIVE CRITERIA: OAR 340-41-0007 (See Appendix B)

NUMERIC CRITERION: OAR 340-041-0019 (See Appendix B)

DATA REQUIREMENTS:
Site specific data on aquatic weeds or algae for the time period of interest.

Assessment Methodology: Category 5: Water Quality Limited (303(d) List)
Aquatic Weeds: Documented reports of excessive growths of invasive, non-native aquatic plants that dominate the assemblage in a water body and have a harmful effect on fish or aquatic life or are injurious to health, recreation, or industry. Plants include aquatic species on the Oregon Department of Agriculture Noxious Weed Policy and Classification System designated as "A", "B", or "T" weeds or those covered by a quarantine in OAR 603-052-1200.

Algae: Health advisories issued by the Oregon Health Authority, in conjunction with other federal, state, county, city or local agencies, warning that potentially harmful levels of toxins produced by blue-green algae (cyanobacteria) are present in a water body. Health advisories related to recreational water Contact are posted by the Oregon Public Health Division Harmful Algae Bloom Surveillance (HABS) program at:
http://public.health.oregon.gov/HealthyEnvironments/Recreation/HarmfulAlgaeBlooms/Pages/Blue-GreenAlgaeAdvisories.aspx.

Algae: Documented evidence that algae, including periphyton (attached algae) or phytoplankton (floating algae), are causing other standards to be exceeded (e.g. pH, chlorophyll a, or dissolved oxygen) or impairing a beneficial use.

Summary of data evaluated (only data sources used for listing described):

DATA SOURCE(S):	Oregon Invasive Species Hotline City of Portland
DATA RANGE:	5/1/10-9/30/14
COMMENTS:	Aquatic weed data Species designated A, B or T by Oregon Department of Agriculture
DATA DETECTED:	60 records at 60 stations
# OF IMPAIRMENTS:	9 stations, 6 water quality limited segments (WQLS)

CRITERIA: **Aquatic weeds -** Documented reports of excessive growths aquatic species on the Oregon Department of Agriculture Noxious Weed Policy and Classification System as A, B, or T.
Aquatic Weeds (Water Primrose).

ADDITIONS (BY STATION) TO LIST: 9
ADDITIONS (BY WQLS) TO LIST: 6

DATA SOURCE: Oregon Health Authority
DATA RANGE: 5/1/12-9/30/14
DATA DETECTED: 33 advisories at 25 waterbodies
CRITERIA: Algae - Harmful Algal Bloom advisory from 2012-2014
Aquatic Weeds (Harmful Algal Blooms)

ADDITIONS (BY STATION) TO LIST: 6
ADDITIONS (BY WQLS) TO LIST: 6

Summary of new listings:
After evaluating all readily available data and information, EPA is proposing to add 9 new aquatic weed and 6 new algae-harmful algal stations to Oregon's 303(d) list, 12 total WQLS. The total number of waterbodies listed may differ from the number of sample sites (stations) impaired because there is overlap in the locations between data sets and many of the sites were located within the same LLID (Longitude/Latitude ID, which is the system used by Oregon to identify streams and lakes). The evaluation of aquatic weed data is found in Appendix B and harmful algal bloom data is found in Appendix A.

Parameter: **Bacteria – *E. coli (Escherichia coli)***

Beneficial Uses Affected: Water contact recreation

Narrative Criterion: OAR 340-041-0009(4) (See Appendix B)

Numeric Criterion: OAR 340-041-009(1)(a) (See Appendix B)

Data Requirements: A minimum of 5 representative data points available per site collected on separate days for each time period of interest. Where there were 2 or more data points per day, EPA only used the highest value. Data were analyzed seasonally, summer: June 1 through September 30 and fall-winter-spring (FWS): October 1 through May 31.

Assessment Methodology: Category 5: Water Quality Limited (303(d) list)
A 30-day log mean greater than 126 E. *coli* organisms per 100 ml based on a minimum of five samples or more than 10% of the samples exceed 405 E. *coli* organisms per 100 ml, with a minimum of at least two exceedances.

Summary of data evaluated (only data sources used for listing described):

DATA SOURCE: DEQ
DATA RANGE: 5/1/10-9/30/14
COMMENTS: Surface water quality data only
DATA EVALUATED: 7756 individual measurements at 477 stations
 # OF IMPAIRMENTS: 79 impairments at 60 stations
ADDITIONS (BY STATION) TO LIST: **19**
ADDITIONS (BY WQLS) TO LIST: **12**

DATA SOURCE: Volunteer Data from DEQ
DATA RANGE: 5/1/2010 - 9/30/2014
DATA EVALUTED: 173 surface water sites
4897 individual measurements from the 173 surface water sites
# of IMPAIRMENTS: 97 impairments at 42 stations
ADDITIONS (BY STATION) TO LIST: **15**
ADDITIONS (WQLS) TO LIST: **12**

DATA SOURCE: STORET
DATA PULLED: 10/22/2014
DATA RANGE: 5/1/2010 - 9/30/2014
DATA EVALUTED: 153 surface water sites
2086 individual measurements from the 153 surface water sites
# of IMPAIRMENTS: 46 impairments at 28 stations
ADDITIONS (BY STATION) TO LIST: **1**
ADDITIONS (BY WQLS) TO LIST: **1**

Summary of new listings:
After evaluating all readily available data and information, EPA is proposing to add 35 stations for e coli to Oregon's 303(d) list, 25 WQLS. The total number of new waterbodies listed may differ from the

number of sample sites (stations) impaired because there is overlap in the locations between data sets and many of the sites were located within the same LLID (Longitude/Latitude ID, which is the system used by Oregon to identify streams and lakes). The evaluation of *E. coli* data is found in Appendix F.

PARAMETER: Bacteria – Enterococci

BENEFICIAL USES AFFECTED: Water Contact Recreation

NUMERIC CRITERION: 40 CFR Part 131.41(See Appendix B)

Data Requirements: A minimum of 5 representative data points available per site collected on separate days for each seasonal time period in a given year. For results reported at or below the Minimum Reporting Level (<MRL), the numeric value of the MRL was used to calculate the geometric mean. Where there were 2 or more data points per day, EPA only used the highest value. Data were analyzed seasonally, summer: May 1 through September 30 and winter: October 1 through April 30.

Assessment Methodology: Category 5: Water Quality Limited (303(d) List)
A geometric mean for samples collected over a seasonal sampling period greater than 35 Enterococci per 100 ml based on a sample set of 5 or more samples.

Summary of data evaluated (only data sources used for listing described):

DATA SOURCE:	DEQ
DATA RANGE:	5/1/10-9/30/14
COMMENTS:	Surface water quality data only water column data only
DATA DETECTED:	1797 individual measurements at 105 stations
# OF IMPAIRMENTS:	34 impairments at 33 stations
ADDITIONS (BY STATION) TO LIST:	**8**
ADDITIONS (BY WQLS) TO LIST:	**1**

Summary of new listings:
After evaluating all readily available data and information, EPA is proposing to add 8 new stations for Enterococci to Oregon's 303(d) list, 1 WQLS. The total number of waterbodies listed may differ from the number of sample sites (stations) impaired because there is overlap in the locations between data sets and many of the sites were located within the same LLID (Longitude/Latitude ID, which is the system used by Oregon to identify streams and lakes). The evaluation of Enterococci data is found in Appendix G.

PARAMETER: Biocriteria

BENEFICIAL USES AFFECTED: Aquatic Life

NARRATIVE CRITERION: OAR 340-041-0011 (See Appendix B)

Assessing Macroinvertebrate Communities
Waters of the State must be of sufficient quality to support aquatic species without detrimental changes in the resident biological communities. To assess the biological integrity of macroinvertebrate communities, DEQ developed a multivariate predictive model (Hubler, 2008). Using data from reference sites, the model describes the number and types of macroinvertebrates that are expected to be in a water body when the water is in least disturbed conditions. The model that DEQ developed for Oregon is called the PREDictive Assessment Tool for ORegon, or PREDATOR. This model assesses the macroinvertebrate communities in Oregon's perennial, wadeable streams. It analyzes data from reference sites grouped into three regions in Oregon and models the expected assemblage. Information from a sampling site can be compared to the macroinvertebrate assemblage predicted by the model and an assessment made about how different the observed assemblage is from the expected or reference assemblage. Discussion of the scientific basis for the model development, statistical analysis of reference site data, and basis for selecting benchmark values in terms of the reference site distributions in different regions in Oregon is given in a separate technical paper (Stoddard, et al, 2006).

However, the PREDATOR model is not the only way in which to interpret the biological criteria. For example, some sites may have macroinvertebrate data collected with different methods than used to construct the models, but the data can also be highly indicative of impairment based on commonly used assemblage characteristics such as low taxa richness, high dominance, upstream vs. downstream differences, etc.

Data Requirements:
We used sample data collected during or after 2009. Site samples must be collected within the model season of June 1 through October 15. Site sample data must be collected using standard field methods and identified to appropriate taxonomic levels, as described in the DEQ Mode of Operations Manual, or equivalent protocols used throughout the Pacific Northwest (ODEQ, 2009). One sample result is sufficient to evaluate for the assessment using the benchmarks developed from the PREDATOR model. To use the PREDATOR model, macroinvertebrate sampling data was from riffle samples on perennial, wadeable streams. Samples with PREDATOR model counts less than 150 total individuals were not used. In addition, data was not used that was not collected and/or analyzed with consistent field and/or laboratory methods which were used to construct the PREDATOR models. Also, we did not use PREDATOR score that where DEQ calculated that the sample failed the Chi-square test of environmental predictors, compared to the reference population, at the 0.01 level.

For data that did not have a PREDATOR score calculated, we used data collected since 2009 during the index period June 1 through October 15. We only used data collected with published and well established field and laboratory methods.

Assessment Methodology:
Category 5: Water Quality Limited, TMDL Needed (303(d) List)
Macroinvertebrate sampling data from perennial, wadeable streams were evaluated by using the PREDATOR model scores as calculated by as shown in Table 1.

Table 1: Biocriteria Assessment Benchmarks

PREDATOR Model Region	**Category 5: Water Quality Limited**
Marine Western Coastal Forest	≥ 15% taxa loss
	PREDATOR score ≤ 0.85
Western Cordillera and Columbia Plateau	≥ 22% taxa loss
	PREDATOR score ≤ 0.78
Northern Basin And Range	≥ 50% taxa loss
	PREDATOR score ≤ 0.50

For other data of acceptable quality, we looked at upstream/downstream changes in metrics such as taxa richness, percent dominance and EPT taxa richness.

Summary of data evaluated (only data sources used for listing described):

DATA SOURCE: DEQ
DATA RANGE: 1/1/2009 - 9/30/2014
DATA DETECTED: 49 individual measurements at 45 stations (since 2009)
 # OF IMPAIRMENTS: 30
ADDITIONS (BY STATION): **25**
ADDITIONS (BY WQLS) TO LIST: **24**

Summary of new listings:
After evaluating all readily available data and information, EPA is proposing to add 25 new stations for biocriteria to Oregon's 303(d) list, 24 WQLS. The total number of waterbodies listed may differ from the number of sample sites (stations) impaired because there is overlap in the locations between data sets and many of the sites were located within the same LLID (Longitude/Latitude ID, which is the system used by Oregon to identify streams and lakes). The evaluation of biocriteria data is found in Appendix C.

Biocriteria References

Hubler, S., July 2008, PREDATOR: Development and Use of RIVPACS-type Macroinvertebrate Models to Assess the Biotic Condition of Wadeable Oregon Streams, Technical Report DEQ08-LAB-0048-TR.

ODEQ, 2009, Mode of Operations Manual, Version 3.2, DEQ03-LAB-0036-SOP, http://www.deq.state.or.us/lab/techrpts/docs/DEQ03LAB0036SOP.pdf

Stoddard,J.L., et.al., 2006. Setting Expectations for the Ecological Condition of Streams: The Concept of Reference Condition. Ecological Applications. 16(4): 1267-1276.

Parameter: **Chlorophyll a**

Beneficial Uses Affected: Water contact recreation
Aesthetics
Fishing
Water Supply
Livestock Watering

Numeric Criterion: OAR-340-041-0019 (See Appendix B)

Data Requirements: A minimum of three samples collected over any three consecutive months (at least one per month) at a minimum of one representative location.

Assessment Methodology: Category 5: Water Quality Limited (303(d) list)
The average chlorophyll a value over three consecutive months exceeds the value referenced in the rule. The average must be calculated with at least one sample in each month. Where there were 2 or more data points per day, EPA only used the highest value.

Summary of data evaluated (only data sources used for listing described):
DATA SOURCE: DEQ
DATA RANGE: 5/1/10-9/30/14
COMMENTS: Surface water quality data only
water column data only
DATA DETECTED: 2288 individual measurements at 500 sites
ADDITIONS (BY STATION) TO LIST: **5**
ADDITIONS (BY WQLS) TO LIST: **5**

Summary of new listings:
After evaluating all readily available data and information, EPA is proposing to add 5 new stations for Chlorophyll a to Oregon's 303(d) list, 5 WQLS. The total number of waterbodies listed may differ from the number of sample sites (stations) impaired because there is overlap in the locations between data sets and many of the sites were located within the same LLID (Longitude/Latitude ID, which is the system used by Oregon to identify streams and lakes). The evaluation of chlorophyll a data is found in Appendix D.

Parameter: **Dissolved Oxygen**

Beneficial Uses Affected: Fish and Aquatic Life
Salmon and Steelhead Spawning
Resident Trout Spawning
Cold-Water Aquatic Life
Cool-Water Aquatic Life
Warm-Water Aquatic Life
Estuarine Water

Numeric Criterion: OAR-340-041-0016 (See Appendix B)

Data Requirements: A minimum of 5 representative data points available per site collected on separate days per applicable time period. A **sample** can be one "grab sample" or a single measurement in a set of continuous monitoring data results (i.e. multiple measurements collected over an extended time period). The daily mean of continuous dissolved oxygen data is calculated and represents on data point. Any combination of 5 days of continuous or grab sample data in the time period is acceptable.

Assessment Methodology: Category 5: Water Quality Limited (303(d) list)
Greater than 10 percent of samples exceed the appropriate criterion and a minimum of at least two exceedances of the criterion for the time period of interest.

Oregon's water quality standards for dissolved oxygen include different criteria for freshwaters supporting several types of aquatic life including sensitive fish species and life stages, as well as criteria for estuarine and ocean waters. The criteria apply to various waters throughout the state and at different time periods throughout a calendar year. Determining the applicable criteria to use to assess dissolved oxygen data is the first step in the data evaluation process. The water quality standards have been clarified through several policy letters and memorandum that are incorporated into the assessment protocols in order to provide a method to determine what criteria apply to specific water bodies, and when to apply the criteria. The dissolved oxygen criteria in OAR 340-041-0016 applicable to freshwater aquatic life and fish uses are summarized in the following table:

Dissolved Oxygen Standard	**Spawning**	**Cold**	**Cool**	**Warm**
Aquatic Life Use	Active spawning areas	Cold-water aquatic life	Cool-water aquatic life	Warm-water aquatic life
Dissolved Oxygen Criteria (mg/l)	11.0	8.0	6.5	5.0
Dissolved Oxygen % Saturation	Not less than 95 % saturation	Not less than 90 % saturation	----	----

In developing its list of impaired waters for dissolved oxygen, EPA utilized Oregon's 2012 assessment methodology. Additional details on dissolved oxygen data analysis can be found in that document.

Summary of data evaluated (only data sources used for listing described):

DATA SOURCE: Oregon DEQ
DATA RANGE: 5/1/2010-9/30/14
DATA EVALUATED: 26556 measurements at 799 stations
CRITERIA: see OAR 340-041-0016
ADDITIONS (BY STATION) TO LIST: 35
ADDITIONS (BY WQLS) TO LIST: 26

DATA SOURCE: STORET
DATA RANGE: 5/1/2010-9/30/14
DATA EVALUATED: 58592 measurements at 183 stations
CRITERIA: see OAR 340-041-0016
ADDITIONS (BY STATION) TO LIST: 13
ADDITIONS (BY WQLS) TO LIST: 7

DATA SOURCE: USGS
DATA RANGE: 5/1/2010-9/30/14
DATA EVALUATED: 55847 measurements at 46 stations
CRITERIA: see OAR 340-041-0016
ADDITIONS (BY STATION) TO LIST: 1
ADDITIONS (BY WQLS) TO LIST: 1

DATA SOURCE: Volunteer data provided by DEQ
DATA RANGE: 5/1/2010-9/30/14
DATA EVALUATED: 11344 measurements at 446 stations
CRITERIA: see OAR 340-041-0016
ADDITIONS (BY STATION) TO LIST: 26
ADDITIONS (BY WQLS) TO LIST: 16

Summary of new listings:
After evaluating all readily available data and information, EPA is proposing to add 75 new dissolved oxygen listings (by waterbody) to Oregon's 303(d) list, 50 WQLS. The total number of waterbodies listed may differ from the number of sample sites (stations) impaired because there is overlap in the locations between data sets and many of the sites were located within the same LLID (Longitude/Latitude ID, which is the system used by Oregon to identify streams and lakes). The evaluation of dissolved oxygen data is found in Appendix E.

Parameter: **pH**

Beneficial Uses Affected: Resident Fish and Aquatic Life
Water Contact Recreation

Narrative Criterion: OAR-340-041-0021(2) (See Appendix B)

Numeric Criterion: Statewide: OAR 340-041-0021 (See Appendix B)
Basin-Specific: OAR 340 041-0101 through OAR 340-410350 (See Appendix B)

Data Requirements: A minimum of 5 representative data points available per site collected on separate days for each time period of interest. Data were analyzed seasonally, summer: June 1 through September 30 and fall-winter-spring: October 1 through May 31.

Assessment Methodology: Category 5: Water Quality Limited (303(d) list)
Greater than 10 percent of the samples are outside the range of the appropriate criterion and a minimum of at least two samples outside the range of the appropriate criterion for the time period of interest. Where there were 2 or more data points per day, EPA only used the highest value.

Summary of data evaluated (only data sources used for listing described):

DATA SOURCE: DEQ
DATA RANGE: 5/1/10-9/30/14
DATA DETECTED: 10,041 individual measurements at 692 stations
 # OF IMPAIRMENTS: 48 impairments at 36 stations
ADDITIONS (BY STATION) TO LIST: **11**
ADDITIONS (BY WQLS) TO LIST: **8**

DATA SOURCE: Volunteer data from DEQ
DATA RANGE: 5/1/2010 - 10/1/2014
DATA EVALUTED: 344 surface water sites
8381 individual measurements
# of IMPAIRED SITES: 62 impairments at 50 sites
ADDITIONS (BY STATION) TO LIST: **32**
ADDITIONS (BY WQLS) TO LIST: **20**

DATA SOURCE: USGS - online water quality data
DATA PULLED: 10/15/2014
DATA RANGE: 5/1/2010 - 10/1/2014
COMMENTS: Surface water quality data only, parameter code: 00400 & 00403
parameter code 00400 defined as: pH, water, unfiltered, field, standard units
parameter code 00403 defined as: pH, water, unfiltered, laboratory, standard
DATA EVALUTED: 73 surface water sites
5135 individual measurements
# of IMPAIRED SITES: 12 impairments at 11 sites
ADDITIONS (BY STATION) TO LIST: **4**
ADDITIONS (BY WQLS) TO LIST: 3

DATA SOURCE: STORET
DATA PULLED: 10/16/2014
DATA RANGE: 05/01/2010 - 10/01/2014
DATA EVALUTED: 2690 individual measurements
170 stations
# of IMPAIRMENTS: 28 impairments from 20 sites
ADDITIONS (BY STATION) TO LIST: 7
ADDITIONS (BY WQLS) TO LIST: 4

Summary of new listings:
After evaluating all readily available data and information, EPA is proposing to add 54 stations for pH to Oregon's 303(d) list, 35 WQLS. The total number of waterbodies listed may differ from the number of sample sites (stations) impaired because there is overlap in the locations between data sets and many of the sites were located within the same LLID (Longitude/Latitude ID, which is the system used by Oregon to identify streams and lakes). The evaluation of pH data is found in Appendix H.

Parameter:	**Temperature**
Beneficial Uses Affected:	Salmon and Steelhead Spawning Core Cold Water Habitat Salmon and Trout Rearing and Migration Salmon and Steelhead Migration Corridor Lohontan Cutthroat Trout or Redband Trout Bull Trout Spawning and Juvenile Rearing
Narrative Criterion:	OAR 340-041-0028 (See Appendix B)
Numeric Criterion:	OAR 340-041-0028 (4) (See Appendix B)
Data Requirements:	Continuous temperature data collected since 2010 for the time period of interest. "Grab" temperature readings will not be evaluated and "grab" data included in prior assessments were not re-evaluated.
Assessment Methodology:	Category 5: Water Quality Limited (303(d) list) Where continuous temperature data are collected, the seven-day average maximum temperature exceeds the applicable criterion. 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.

Only continuous data is used to determine compliance with the water quality standard in Oregon consistent with Oregon DEQ's assessment methodology. Data was downloaded by Hydrologic Unit Code (HUC): geographic unit based on hydrology delineated by USGS; also called "subbasins"). If any HUC that had less than 168 data points (the minimum for one week of continuous data) in the DEQ, STORET or NWIS (National Water Information System: USGS's database for water monitoring information) databases, that data was not downloaded. Sites were only analyzed for locations and seasons which are not currently listed as impaired for temperature.

Summary of data evaluated (only data sources used for listing described):

DATA SOURCE: USGS
DATA RANGE: 5/1/10-9/30/14
COMMENTS: Surface water quality data only
water column data only
DATA EVALUATED: 17679 records from 15 stations
ADDITIONS (BY STATION) TO LIST: 3
ADDITIONS (BY WQLS) TO LIST: 3

DATA SOURCE: STORET
DATA RANGE: 5/1/10-9/30/14
COMMENTS: Surface water quality data only
water column data only
DATA EVALUATED: 150836 records from 43 sites
ADDITIONS (BY STATION) TO LIST: 6
ADDITIONS (BY WQLS) TO LIST: 6

DATA SOURCE: ACOE
DATA RANGE: 5/1/10-9/30/14
COMMENTS: Surface water quality data only
water column data only
ADDITIONS (BY STATION) TO LIST: 1
ADDITIONS (BY WQLS) TO LIST: 1

Summary of New Listings:
After evaluating all readily available data and information, EPA is proposing to add 10 new temperature listings by station to Oregon's 303(d), 10 WQLS. The total number of waterbodies listed may differ from the number of sample sites (stations) impaired because there is overlap in the locations between data sets and many of the sites were located within the same LLID (Longitude/Latitude ID, which is the system used by Oregon to identify streams and lakes). The evaluation of temperature data is found in Appendix J.

Parameter:	**Total Dissolved Gas**
Beneficial Uses Affected:	Resident Fish and Aquatic Life
Narrative Criterion:	OAR 340-041-0031(1) (See Appendix B)
Numeric Criterion:	OAR 340-041-0031(2) (See Appendix B)
Assessment Methodology:	Category 5: Water Quality Limited (303(d) list) More than 10 percent of the samples exceed standard and a minimum of at least two exceedances of the standard, or a survey that identifies beneficial use impairment due to total dissolved gas such as assessment of fish conditions.

EPA's review of total dissolved gas (TDG) data:
EPA reviewed all readily available TDG data and information in LASAR, STORET, USGS and other datasets and found no exceedances of Oregon's water quality standards.

Parameter: **Total Phosphorus**

Beneficial Uses Affected: Resident Fish and Aquatic Life
Water Contact Recreation
Drinking Water

Phosphorus is an essential element for plant life, but when there is too much of it in water, it can speed up eutrophication (a reduction in dissolved oxygen in water bodies caused by an increase of mineral and organic nutrients) of rivers and lakes. Excessive phosphorus in surface waters can cause negative ecological impacts to waterbodies by stimulating harmful algal blooms, which when they eventually die off and consume dissolved oxygen (DO) from the water column.

Oregon has not set a criterion for total phosphorus. EPA has recognized the relationship between phosphorus, as a major nutrients, and excessive aquatic weed and algae growth, and lake and reservoir eutrophication. EPA has recommended total phosphorus values in various documents (see table below) ranging from 8.8 to 100 ug/L.

Total Phosphorus (ug/L) recommendation	Reference	Waterbody type
100 ug/L	EPA 1987 Gold book	Streams or other flowing waters not directly discharging to lakes or impoundments
50 ug/L	EPA 1987 Gold book	Any stream at the point where it enters any lake or reservoir
25 ug/L	EPA 1987 Gold book	The lake or reservoir
10 – 47 ug/l, depending on ecoregion	EPA 2001 Ecoregional nutrient criteria recommendations	Rivers and streams
8.8 – 17 ug/L, depending on ecoregion	EPA 2000 Ecoregional nutrient criteria recommendations	Lakes and reservoirs

In 2010 Water Quality Report, Oregon DEQ used 50 ug/L as a benchmark to evaluate water quality data for phosphate phosphorus. Water bodies with total phosphates as phosphorus (P) greater than 50 ug/L were placed in Category 3B Insufficient Data – Potential Concern for conditions that may result in not meeting water quality standards. EPA does not agree with this evaluation.

Nutrients cannot be treated as human introduced pollutants such as pesticides or toxics, because they are not uniquely generated through human input or disturbance. Rather, nutrients are components of natural systems, like temperature and dissolved oxygen, that are present even in the most pristine settings. Nutrients (nitrogen and phosphorus) are one of the leading causes of water quality impairment in our Nation's rivers, lakes and estuaries.

Assessment Methodology: Category 5: Water Quality Limited (303(d) list)

It is EPA's goal for this listing cycle to add to Category 5 only the most egregious problems. Our assessment method had two parts:

1. Greater than 10 percent of the samples above 100 ug/L and a minimum of at least two samples above this value for the time period of interest. Where there were 2 or more data points per day, EPA only used the highest value, AND;

2. The waterbody was either already, or proposed for this listing cycle, impaired for any one of the following parameters: pH, Chlorophyll a or dissolved oxygen.

EPA's assessment method is intended only to be a rough screen to capture the most problematic waters. We encourage Oregon DEQ to develop their own methodology.

Summary of data evaluated (only data sources used for listing described):

DATA SOURCE:	Storet
DATA PULLED:	11/23/2014
DATA RANGE:	05/01/2010-10/01/2014
COMMENTS:	Surface water quality data only
DATA EVALUTED:	86 sites
	2443 individual measures from 180 sites
	No ditches, canals or drains
CRITERIA	.1 mg/L (goldbook)
ADDITIONS TO (BY STATION):	**16**
ADDITIONS (BY WQLS) TO LIST:	**9**

DATA SOURCE:	USGS - online water quality data
DATA PULLED:	10/20/2014
DATA RANGE:	05/01/2010-10/01/2014
COMMENTS:	Surface water quality data only
	Parameter code 00665 - Phosphorus, water, unfiltered, milligrams per liter as phosphorus
DATA EVALUTED:	86 sites
	4282 individual measures from 86 sites
	No ditches, canals or drains
CRITERIA:	.1 mg/L (goldbook)
ADDITIONS TO (BY STATION) LIST:	9
ADDITIONS TO (BY WQLS) LIST:	9

DATA SOURCE:	DEQ
DATA RANGE:	5/1/10-9/30/14
COMMENTS:	Surface water quality data only
	water column data only
DATA DETECTED:	10698 individual measurements at 534 stations
CRITERIA:	.1 mg/L
ADDITIONS TO (BY STATION):	**28**
ADDITIONS TO (BY WQLS) LIST:	**22**

Summary of new listings:
After evaluating all readily available data and information, EPA is proposing to add 53 new stations for total phosphorus to Oregon's 303(d), 40 WQLS. The total number of waterbodies listed may differ from the number of sample sites (stations) impaired because there is overlap in the locations between data sets and many of the sites were located within the same LLID (Longitude/Latitude ID, which is the

system used by Oregon to identify streams and lakes). The evaluation of total phosphorus data is found in Appendix I.

Parameter: **Toxics**

Beneficial Uses Affected: Aquatic Life – Fresh Water and Marine Water
Human Health – Water and Fish Ingestion, Fish Consumption and Drinking Water

Narrative Criterion: OAR 340-041-0033(See Appendix B)

Numeric Criterion: OAR 340-041-0033 (See Appendix B)

Data Requirements: Data collected since 1999.

Assessment Methodology: Category 5: Water Quality Limited (303(d) list)
Two or more valid results not meeting the most stringent applicable criterion for concentrations of a specific toxic substance in the water column.
Or
A fish consumption advisory issued for a specific water body based on pollutants in fish tissue issued by the Oregon Department of Human Services. Fish advisories are posted at:
http://www.oregon.gov/DHS/ph/envtox/fishadvisories.shtml),
Or
The geometric mean of a minimum of three (3) or more valid results not meeting the fish tissue criterion for **methylmercury** if the results are from skinless fillets of individual fish,
Or
The arithmetic mean of two (2) or more valid results not meeting the fish tissue criterion for **methylmercury** if the results are from composited skinless fillets from multiple fish of the same species.

EPA's review of toxics data:
EPA used values from Oregon DEQ Table 30: Aquatic Life Water Quality Criteria for Toxic Pollutants Effective April 18, 2014 and TABLE 31: Aquatic Life Water Quality Guidance Values for Toxic Pollutants Effective April 18, 2014. In cases where a particular toxic parameter is not listed, it is because EPA did not find detected values of that parameter in DEQ, STORET or USGS databases. Where there were 2 or more data points per day, EPA only used the highest value.

PARAMETER	DATA SOURCE	DATA DETECTED	CRITERIA	ADDITIONS (BY STATION) TO LIST	ADDITIONS (BY WQLS) TO LIST
4,4´-DDD	DEQ	25 individual measurements at 10 stations	0.031 ng/L	6	6

PARAMETER	DATA SOURCE	DATA DETECTED	CRITERIA	ADDITIONS (BY STATION) TO LIST	ADDITIONS (BY WQLS) TO LIST
4,4´-DDE	DEQ	34 individual measurements at 14 stations	0.022 ng/l	9	9
4,4´-DDT	DEQ	21 individual measurements at 6 stations	0.022 ng/l	6	6
Arsenic (Dissolved Arsenic & Total recoverable Arsenic converted by 76%, Total inorganic Arsenic used as is)	DEQ	1209 individual measurements at 197 stations	1.0 ug/L for saltwater 2.1 ug/L for freshwater	29	23
	USGS	834 individual measurements from 43 stations		4	3
Alpha-Chlordane	DEQ	6 individual measurements at 3 stations	0.081 ng/L	2	2
Chloride	DEQ	277 individual measurements at 156 stations	230 mg/L	1	1
Chlorpyrifos	DEQ	85 individual measurements at 26 stations	41 ng/l	7	7
Copper	DEQ	231 individual measurements at 88 stations	3.62 ug/L at 25 hardness	16	8
	USGS	720 individual measurements at 32 stations		3	2
Diazinon	DEQ	10 individual measurements at 4 stations	50 ng/L	2	2
Dieldrin	DEQ	35 individual measurements at 14 stations	0.0053 ng/L	9	9
Endosulfan	DEQ	176 individual measurements at 35 stations	56 ng/L	2	2
Ethylbenzene	STORET	549 individual measurements at 1 station	160 ug/L	1	1
Heptachlor epoxide	DEQ	17 individual measurements at 7 stations	0.0039 ng/L	4	4

PARAMETER	DATA SOURCE	DATA DETECTED	CRITERIA	ADDITIONS (BY STATION) TO LIST	ADDITIONS (BY WQLS) TO LIST
Iron	DEQ	530 individual measurements at 199 stations	1000 ug/L	14	11
	STORET	83 individual measurements at 31 stations		3	
Lead	DEQ	176 individual measurements at 95 stations	0.54 ug/L at 25 hardness	8	7
Malathion	DEQ	104 individual measurements at 16 stations	100 ng/L	3	2
Mercury	DEQ	119 individual measurements at 18 stations	0.012 ug/L	2	2
Thallium	DEQ	10 individual measurements at 8 stations	0.043 ug/L	2	2
Tissue – Clams – Arsenic	DEQ	55 individual measures from 12 stations	OHA health advisory	11	11
Tissue – Fish - DDT	Storet	378 individual measures from 1 station	32 ug/kg	1	1
Tissue – Fish – Mercury	DEQ & EPA	98 individual measures from 15 stations	0.040 mg/kg	13	18
Zinc	USGS	721 individual measurements at 32 stations	36 ug/l at 25 mg/L hardness	2	1

Summary of New Listings:
After evaluating all readily available data and information, EPA is proposing to add 160 new sample stations to be listed for toxics on Oregon's 303(d) list, 144 WQLS. The total number of new listings may differ from the number of sample sites impaired because there is overlap in the locations between data sets and many of the sites were located within the same LLID (Longitude/Latitude ID, which is the system used by Oregon to identify streams and lakes). The evaluation of toxics data is found in Appendix K.