

Oregon Water Quality Index Summary Report

Water Years 1992-2001

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Introduction

The Oregon Water Quality Index (OWQI) analyzes a defined set of water quality variables and produces a score describing general water quality. The water quality variables included in the OWQI are temperature, dissolved oxygen (percent saturation and concentration), biochemical oxygen demand, pH, total solids, ammonia and nitrate nitrogens, total phosphorus, and fecal coliforms. OWQI scores range from 10 (worst case) to 100 (ideal water quality). The Department of Environmental Quality Laboratory maintains a network of ambient water quality monitoring sites. These sites were selected to provide representative statewide geographical coverage, and to include major rivers and streams throughout the state. There are currently 151 monitoring sites in the network. The size of the network periodically changes due to logistical and budgetary constraints.

For this Summary Report, OWQI results were calculated at these sites on all samples taken in Water Years 1992-2001. No Summary Report was prepared for Water Years 1991-2000. These data are analyzed to determine which parameters influence general water quality during various seasons. Each site, with sufficient data, is analyzed for the presence of significantly increasing or decreasing trends. The nonparametric Seasonal-Kendall test is used for trend analysis to ensure that the significant trends that exist are not due to normal seasonal variation. Significant trends are reported at the 80% or greater confidence level. Seasonal Sen slope determines the magnitude of the trend.

Seasonal averages were calculated for the summer season (June - September) and FWS season (fall, winter, spring: October - May). The minimum of these seasonal averages is used for ranking purposes and takes into account seasonal variability between different river systems.

Figure 1 displays OWQI status and trending information, with respect to geographical location.

Benchmark Report

Oregon's surface water quality benchmark, as reported in the Oregon Progress Board's "Oregon Shines" report (Benchmark 78), is expressed in the following manner:

- Percentage of monitored stream sites with significantly increasing trends in water quality:
- Percentage of monitored stream sites with significantly decreasing trends in water quality:
- Percentage of monitored stream sites with water quality in good to excellent condition:

The first two benchmarks will be referred to as trend benchmarks. Both trend benchmarks represent the percentage of monitored stream sites with significantly increasing or decreasing trends in water quality, with respect to the total number of monitored stream sites having sufficient data for trend analysis. The third benchmark will be referred to as the status benchmark. The status benchmark is the percentage of monitoring sites with good to excellent water quality. The percentage is calculated as the ratio of the number of stream monitoring sites ranked with either good or excellent water quality to the total number of ranked stream monitoring sites.

Methodology for calculating these benchmarks is more fully discussed below. Table 1 presents benchmark results. The stated years represent the last water year in a ten water year period. Water years start on October 1 and end on September 30. For instance, calculated benchmark results for 1990 represent trend analyses on data gathered from water year (WY) 1981 to WY 1990, or from October 1, 1980 to September 30, 1990. Benchmark results were originally calculated for 1995. Targeted results for 2005 and 2010 are challenging yet attainable goals based on prior results. Interim benchmark results are calculated annually to measure progress towards the targeted goals.

Ambient Water Quality Monitoring Network

Oregon Water Quality Index Results (WY 1992-2001)

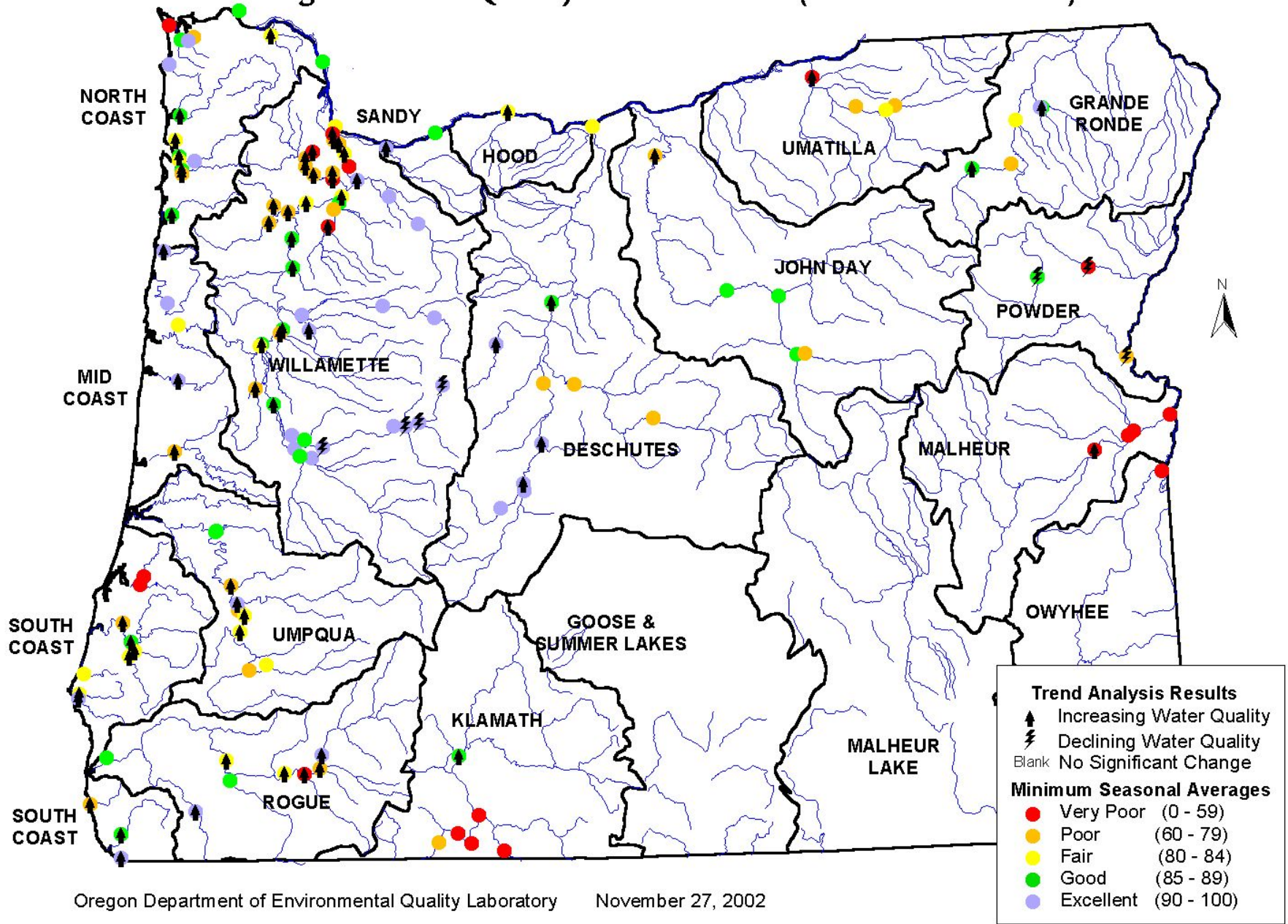


Table 1. Comparison of Calculated and Target Surface Water Quality Benchmarks

<i>Benchmark</i>	<i>1990</i>	<i>1995</i>	<i>1996</i>	<i>1997</i>	<i>1998</i>	<i>1999</i>	<i>2000</i>	<i>2001</i>	<i>2005</i>	<i>2010</i>
Percentage of monitored stream sites with significantly increasing trends in water quality	8%	21%	32%	52%	70%	64%	70%	51%	75%	75%
Percentage of monitored stream sites with significantly decreasing trends in water quality	20%	8%	2%	0%	1%	1%	1%	5%	0%	0%
Percentage of monitored stream sites with good to excellent water quality condition	27%	28%	35%	32%	37%	41%	42%	46%	40%	45%

Significant Changes in Ambient Monitoring Network

During Water Years 2000-2001, changes to the ambient monitoring network and changes in the amount of data available for trend analysis for many monitoring sites influenced benchmark results. Three monitoring sites were added on the Columbia River. All of these sites have good water quality. None of the sites will have sufficient data to perform trend analysis until at least Water Year 2005. Twenty-six previously established sites had, for the first time, sufficient data to perform trend analysis. Although the number of sites with increasing trends in this report (66) is the same as in the report for Water Years 1990-1999, the addition of 26 sites with sufficient data caused the percentage of sites with increasing trends to drop.

Trend Analysis

The nonparametric Seasonal-Kendall trend analysis, available in the WQHydro statistical software package, requires a minimum of thirty data points to detect the presence of statistically significant trends at any given monitoring site. For each site, the data set is divided into twelve monthly, six bimonthly, or four quarterly subsets, depending on data quantity. The preferred method is to use monthly subsets. Bimonthly subsets were used unless the monitoring frequency for the particular site was greater than bimonthly. If there is more than one sample in a given period, the sample closest to the middle of that period was used. Since these particular datasets don't consistently contain multiple samples in each period (month or quarter), selecting samples in this manner ensures a more regular variance.

These subsets are compared and an annualized result is generated, indicating whether or not a significant trend exists. Also indicated are the magnitude and significance of the trend. This procedure ensures that increasing or decreasing trends are consistent through most of the year and that the trends are not due to normal seasonal variation.

Of the 136 monitoring sites included in this report (not all monitoring stations generate all data required for OWQI calculations), 129 had sufficient data to analyze for trends. Of these 129 sites, 66 had significant increases in water quality and seven had significant decreases in water quality, while the rest showed no significant trend in either direction. Tables 2 and 3 list these sites and indicate the magnitude and significance of each trend. The magnitude of the trend is derived from the Seasonal Sen slope of the data. This trend analysis did not consider variations in meteorological or hydrological conditions or variations in sample time. It is important to remember that this trend analysis assesses changes in general water quality, specifically those parameters included in the OWQI. This assessment does not consider changes in toxics concentrations, habitat, or biology.

Some of the sites showing significant improvement in general water quality (Table 2) are downstream of significant point sources, primarily wastewater treatment plants. There have been major efforts to reduce the quantity and improve the quality of discharge from point sources. OWQI results show that these efforts have been successful. Other sites showing significant improvement are not affected by point source discharges, so impacts to water quality are related to non-point source activity. Improvements at these sites may be attributed to reduced levels of non-point source activity, increased education about water quality impacts, and watershed restoration efforts. Underlying all of these factors is flow. As Oregon returns, in stages, from drought to the wet phase of the long-term cycle, flows and water quality improves.

Table 2. River Sites Monitored by DEQ Laboratory Showing a Significant Increase in Water Quality

<i>Monitoring Site</i>	<i>Magnitude</i> ¹	<i>S.L.</i> ²
Bear Creek at Kirtland Road	+19.9	99
Pudding River at HWY 211 (Woodburn)	+13.2	95
Columbia Slough at Landfill Road	+13.1	99
Beaverton Creek at Cornelius Pass Road (Orengo)	+12.0	99
Tualatin River at Elsner Road	+12.0	99
Tualatin River at Boones Ferry Road	+10.1	95
Coquille River at Sturdivant Park Dock	+10.0	99
Tualatin River at Rood Bridge	+9.8	99
Little Butte Creek at Agate Road (White City)	+8.9	99
Tualatin River at HWY 210 (Scholls)	+8.7	98
Calapooia River at Queens Road (Albany)	+8.7	80
Middle Fork Coquille River at HWY 42	+8.0	99
Fanno Creek at Bonita Road (Tigard)	+8.0	99
Willamette River at Newberg Bridge	+7.5	99
Yamhill River at Dayton	+7.5	95
Willamette River at Canby Ferry	+7.0	99
Willamette River at SP&S RR Bridge (Portland)	+6.9	99
Willamette River at Hawthorne Bridge	+6.7	99
Malheur River at Little Valley	+6.6	80
Swan Island Channel midpoint (Willamette River)	+6.6	99
Willamette River at Wheatland Ferry	+6.2	99
North Fork Coquille River at HWY 42	+6.1	99
South Fork Coquille River at Broadbent	+5.6	99
Tillamook River at Bewley Creek Road	+5.4 ³	95
North Yamhill River at Poverty Bend Road	+5.4	80
Rogue River at Robertson Bridge (Merlin)	+5.1	90
Wallowa River at Minam	+5.0	99
Clackamas River at High Rocks	+5.0	99
Willamette River at Salem	+5.0	99
Long Tom River at Stow Pit Road (Monroe)	+5.0	80
Illinois River downstream of Kerby	+4.9	99
Willamette River at HWY 20 (Albany)	+4.9	99
Elk River at HWY 101	+4.6 ³	99
Pistol River at Pistol River Loop Road	+4.6 ³	95
Nehalem River at Foley Road	+4.0 ³	95
Umatilla River at Westland Road (Hermiston)	+4.0	99
South Yamhill River at HWY 99W	+4.0	90
Willamette River at HWY 34 (Corvallis)	+4.0	99

Notes: 1 - Magnitude of decrease in general water quality represented by change in OWQI value during WY 1990-1999.

2 - Significance Level of Seasonal-Kendall trend analysis results.

3 - Stream site was not monitored over the full ten water year period.

Table 2 (continued). River Sites Monitored by DEQ Laboratory Showing a Significant Increase in Water Quality

<i>Monitoring Site</i>	<i>Magnitude</i> ¹	<i>S.L.</i> ²
Nestucca River at Cloverdale	+3.9 ³	99
Winchuck River upstream of HWY 101	+3.9 ³	99
Chetco River at USGS Gage	+3.7 ³	95
Miami River at Moss Creek Road	+3.6 ³	90
Deschutes River at Mirror Pond (Bend)	+3.4	99
Calapooya Creek at Umpqua	+3.4	90
South Umpqua River at HWY 42 (Winston)	+3.4	90
Deschutes River at Harper Bridge (Sunriver)	+3.3	99
Deschutes River at Warm Springs	+3.3	90
Hood River at Hood River, OR	+3.3	98
John Day River at HWY 206	+3.3	80
Salmon River at Otis	+3.0 ³	95
Siuslaw River at HWY 126 (Mapleton)	+3.0 ³	80
Clatskanie River at HWY 30 (Clatskanie)	+3.0 ³	80
Kilchis River at HWY 101	+3.0 ³	80
Trask River at HWY 101	+3.0 ³	80
Sixes River at HWY 101	+3.0 ³	95
North Umpqua River at Garden Valley Road	+2.9	95
Willamette River at HWY 99E (Harrisburg)	+2.9	98
Alesea River at Thissell Road	+2.5 ³	90
Sandy River at Troutdale Bridge	+2.5	98
South Umpqua River at Stewart Park Road (Roseburg)	+2.5	80
South Santiam River at HWY 226 (Crabtree)	+2.5	95
Williamson River at Williamson River Store	+2.0	80
Rogue River at Dodge Park	+2.0	90
Grande Ronde River at Hilgard St. Park	+1.7	80
Metolius River at Bridge 99 (Camp Sherman)	+1.6	95
Rogue River at Rock Point Bridge (Gold Hill)	+1.2	80

Notes: 1 - Magnitude of decrease in general water quality represented by change in OWQI value during WY 1990-1999.

2 - Significance Level of Seasonal-Kendall trend analysis results.

3 - Stream site was not monitored over the full ten water year period.

Factors leading to a significant degradation of water quality (Table 3) may include increased levels of point or non-point source activity and/or decreased flows.

Table 3. River Sites Monitored by DEQ Laboratory Showing a Significant Decrease in Water Quality

<i>Monitoring Site</i>	<i>Magnitude</i> ¹	<i>S.L.</i> ²
Powder River at HWY 86	-7.8	90
Burnt River downstream of Huntington	-3.3	80
Powder River at Campbell St. (Baker City)	-2.1	80
McKenzie River at HWY 126 (downstream of Clear Lake)	-2.0 ³	95
South Fork McKenzie River at NF Road 19	-2.0 ³	99
McKenzie River at McKenzie Bridge	-1.5 ³	99
McKenzie River at Hendricks Bridge	-1.2 ³	80

Notes: 1 - Magnitude of decrease in general water quality represented by change in OWQI value during WY 1990-1999.

2 - Significance Level of Seasonal-Kendall trend analysis results.

3 - Stream site was not monitored over the full ten water year period.

Ranking

The Oregon Water Quality Index was designed to permit comparison of water quality among different stretches of the same river or between different watersheds. The pH and total solids functions within the index account for geological variability. The OWQI calculation formula, an unweighted harmonic square mean function, accounts for the variability of factors limiting water quality in different watersheds. A classification scheme was derived from application of the OWQI to describe general water quality conditions. OWQI scores that are less than 60 are considered very poor; 60-79 poor; 80-84 fair; 85-89 good; and 90-100 excellent. To account for differences in water quality between low flow summer months (June - September) and higher flow fall, winter, and spring (FWS, October - May), average values for summer and FWS were calculated and compared. The list of 136 monitored sites is ranked based on the minimum of the seasonal averages (Tables 4-8).

Table 4. Monitored Sites Ranked by Minimum Seasonal Average OWQI Score - Excellent Category

Basin	Site	River Mile	LASAR Number	Summer Mean	FWS Mean	Minimum Seasonal Average
EXCELLENT						
Willamette - Upper	Blue R. at Blue River Drive	0.3	12655	96	95	95
Willamette - Upper	South Fork McKenzie R. at NF Road 19	3.9	12656	96	95	95
Willamette - Lower	Clackamas R. at McIver Park (Upper Boat Ramp)	22.6	13070	95	95	95
Willamette - Upper	McKenzie R. at McKenzie Bridge	68.1	12552	95	95	95
Willamette - Middle	North Santiam R. at Coopers Ridge Road	63.8	12559	95	94	94
Grande Ronde	Minam R. at Minam	0.1	11457	94	95	94
Willamette - Upper	McKenzie R. at HWY 126 (downstream of Clear Lake)	89.0	12657	94	95	94
Willamette - Upper	Middle Fork Willamette R. at Jasper Bridge	8.0	10386	94	94	94
South Coast	Winchuck R. upstream of HWY 101	2.5	10537	95	93	93
Willamette - Middle	North Santiam R. at Gates School Road	39.0	12553	95	93	93
Willamette - Upper	McKenzie R. at Hendricks Bridge	24.0	10662	93	94	93
Willamette - Middle	North Santiam R. at Green's Bridge	2.9	10792	93	93	93
Mid Coast	Siletz R. 5 miles downstream of Siletz	30.9	10391	94	92	92
Rogue	Rogue R. at Dodge Park	138.4	10423	94	92	92
Deschutes	Deschutes R. at Pringle Falls	217.0	10688	92	94	92
Willamette - Middle	South Santiam R. at HWY 226 (Crabtree)	7.6	10366	93	92	92
Willamette - Upper	Willamette R. at HWY 126 (Springfield)	185.3	10359	93	92	92
Willamette - Upper	McKenzie R. at Coburg Road	7.1	10376	92	93	92
South Coast	Elk R. at HWY 101	3.4	11905	92	92	92
Willamette - Lower	Clackamas R. at Memaloose Road	35.7	14008	95	91	91
Sandy	Sandy R. at Troutdale Bridge	3.1	10674	94	91	91
Deschutes	Little Deschutes R. at HWY 42	4.0	10696	91	94	91
North Coast	Youngs R. at Youngs River Loop Road	8.9	12187	93	91	91
Deschutes	Metolius R. at Bridge 99 (Camp Sherman)	30.3	10690	91	93	91
Deschutes	Deschutes R. at Mirror Pond (Bend)	164.9	10511	92	91	91
Mid Coast	Alsea R. at Thissell Road	17.7	11263	92	91	91
North Coast	Wilson R. at HWY 6	8.5	13424	92	91	91
Deschutes	Deschutes R. at Harper Bridge (Sunriver)	191.7	10686	91	92	91
North Coast	Necanicum R. at Forest Lake Camp	5.8	10521	91	91	91
Rogue	Illinois R. downstream of Kerby	48.4	11482	90	94	90
Willamette - Lower	Clackamas R. at High Rocks	1.2	11233	90	92	90
Mid Coast	Salmon R. at Otis	2.8	11241	90	90	90
Umpqua	North Umpqua R. at Garden Valley Road	1.8	10451	90	90	90

Table 5. Monitored Sites Ranked by Minimum Seasonal Average OWQI Score - Good Category

Basin	Site	River Mile	LASAR Number	Summer Mean	FWS Mean	Minimum Seasonal Average
GOOD						
John Day	North Fork John Day R. at Kimberly	0.2	11017	89	92	89
Willamette - Upper	Willamette R. at HWY 99E (Harrisburg)	161.2	10355	90	89	89
Willamette - Middle	Mollala R. at Canby	3	10637	89	90	89
Powder	Powder R. at Campbell St. (Baker City)	119.3	15565	93	88	88
Columbia	Columbia R. at Warrendale Marker 88 Midchannel	141.0	23794	89	88	88
Rogue	Rogue R. at Lobster Point Bridge	11.0	10414	89	88	88
South Coast	Chetco R. at USGS Gage	10.8	11483	92	87	87
Grande Ronde	Grande Ronde R. at Hilgard St. Park	166.8	10720	87	92	87
Willamette - Upper	Willamette R. at HWY 34 (Corvallis)	131.4	10352	90	87	87
Klamath	Williamson R. at Williamson River Store	4.6	10770	87	90	87
Columbia	Columbia R. at Kalama Marker 59 Midchannel	78.0	23797	88	87	87
North Coast	Kilchis R. at HWY 101	1	13416	87	88	87
North Coast	Trask R. at HWY 101	4.2	13433	87	87	87
Umpqua	Umpqua R. at Elkton	48.4	10437	87	87	87
Willamette - Upper	Mohawk R. at Hill Road	1.6	10663	86	94	86
North Coast	Nestucca R. at Cloverdale	1.7	10523	89	86	86
Willamette - Middle	Willamette R. at Salem	84	10555	89	86	86
Willamette - Upper	Willamette R. at HWY 20 (Albany)	119.3	10350	89	86	86
Columbia	Columbia R. at Cathlamet Marker 41 Midchannel	37.0	23800	88	86	86
Deschutes	Deschutes R. at Warm Springs	96.8	10506	88	86	86
Rogue	Applegate R. at HWY 199	2.6	10428	86	88	86
Umpqua	Elk Creek at Elkton	0.2	10441	86	87	86
Willamette - Middle	Willamette R. at Wheatland Ferry	71.9	10344	86	87	86
Willamette - Upper	Coast Fork Willamette R. at Mt. Pisgah Park	3.0	11275	85	92	85
John Day	John Day R. at Service Creek	157.4	11478	85	91	85
North Coast	Nehalem R. at Foley Road	7.8	11856	90	85	85
Grande Ronde	Wallowa R. at Minam	10.0	10410	85	88	85
John Day	South Fork John Day R. at Dayville	0.2	11020	85	88	85
North Coast	Lewis & Clark R. at Stavebolt Lane	7.6	10817	86	85	85
South Coast	North Fork Coquille R. at HWY 42	0.2	10393	86	85	85

Table 6. Monitored Sites Ranked by Minimum Seasonal Average OWQI Score - Fair Category

Basin	Site	River Mile	LASAR Number	Summer Mean	FWS Mean	Minimum Seasonal Average
FAIR						
Hood	Hood R. at Hood River, OR	1	12012	91	84	84
Rogue	Rogue R. at Rock Point Bridge (Gold Hill)	117.3	10421	87	84	84
South Coast	South Fork Coquille R. at Broadbent	10.0	11486	86	84	84
Willamette - Middle	Willamette R. at Canby Ferry	34.4	10339	85	84	84
Willamette - Upper	Mary's R. at HWY 99W (Corvallis)	0.2	10373	84	84	84
South Coast	Middle Fork Coquille R. at HWY 42	0.2	11485	88	83	83
Willamette - Middle	Willamette R. at Newberg Bridge	48.6	10342	86	83	83
North Coast	Wilson R. at HWY 101	1.8	13421	85	83	83
Rogue	Rogue R. at Robertson Bridge (Merlin)	86.6	10418	85	83	83
North Coast	Miami R. at Moss Creek Road	1.7	13411	83	85	83
Deschutes	Deschutes R. at Deschutes R. Park (Mouth)	1.0	10411	83	83	83
Mid Coast	Yaquina R. downstream of Chitwood	24.9	11476	89	82	82
Umpqua	South Umpqua R. at Days Creek Cutoff Road	55.5	11484	82	89	82
Umpqua	South Umpqua R. at Stewart Park Road (Roseburg)	10.7	11522	82	86	82
North Coast	Clatskanie R. at HWY 30 (Clatskanie)	4.7	11434	82	85	82
South Coast	Sixes R. at HWY 101	5.5	10533	91	81	81
South Coast	Floras Creek at HWY 101	4.1	12590	87	81	81
Columbia	Columbia R. at Portland Marker 47 (u/s Willamette)	102.5	10616	86	81	81
Grande Ronde	Grande Ronde R. at HWY 82 (Elgin)	99.0	10719	81	86	81
Umatilla	McKay Creek at Kirk St. (Pendleton)	1.5	12005	87	80	80
Umpqua	South Umpqua R. at HWY 42 (Winston)	21.2	10443	80	86	80
Willamette - Lower	Willamette R. at Hawthorne Bridge	13.2	10611	83	80	80

Table 7. Monitored Sites Ranked by Minimum Seasonal Average OWQI Score - Poor Category

Basin	Site	River Mile	LASAR Number	Summer Mean	FWS Mean	Minimum Seasonal Average
POOR						
Mid Coast	Siuslaw R. at HWY 126 (Mapleton)	20.5	10392	79	92	79
Umpqua	Cow Creek at Mouth (Riddle)	0.3	10997	79	88	79
Willamette - Middle	South Yamhill R. at HWY 99W	16.5	10948	87	79	79
Willamette - Lower	Willamette R. at SP&S RR Bridge (Portland)	7.0	10332	82	79	79
South Coast	Coquille R. at Sturdivant Park Dock	24.5	10596	81	79	79
John Day	John Day R. upstream of Dayville	215.4	11479	78	86	78
Umpqua	Calapooya Creek at Umpqua	0.4	10996	83	78	78
Deschutes	Crooked R. at Conant Basin Road	105.0	11477	78	82	78
Willamette - Lower	Swan Island Channel midpoint (Willamette R.)	0.5	10801	78	81	78
Deschutes	Deschutes R. at Lower Bridge	133.4	10508	77	87	77
Umatilla	Umatilla R. at Yoakum	37.2	10404	77	81	77
Umatilla	Umatilla R. at HWY 11 (Pendleton)	57.1	10406	76	90	76
Willamette - Upper	Long Tom R. at Stow Pit Road (Monroe)	4.7	11140	76	79	76
Grande Ronde	Grande Ronde R. at Peach Ln. (Island City)	151.1	11521	75	86	75
Willamette - Middle	North Yamhill R. at Poverty Bend Road	4.5	10929	83	75	75
John Day	John Day R. at HWY 206	39.5	11386	74	88	74
Willamette - Upper	Calapooya R. at Queens Road (Albany)	3.0	11180	77	74	74
North Coast	Tillamook R. at Bewley Creek Road	6.8	13440	73	84	73
Willamette - Lower	Tualatin R. at Rood Bridge	39.0	10461	83	73	73
South Coast	Pistol R. at Pistol River Loop Road	1.2	11493	72	84	72
Willamette - Middle	Yamhill R. at Dayton	5.0	10363	77	70	70
Rogue	Little Butte Creek at Agate Road (White City)	1.4	10602	69	78	69
Powder	Burnt R. downstream of Huntington	1.1	14336	69	72	69
Deschutes	Crooked R. at Lone Pine Road	29.9	10517	68	70	68
Umpqua	South Umpqua R. at Melrose Road	5.1	10442	65	83	65
Willamette - Lower	Tualatin R. at Elsner Road	16.2	10458	70	65	65
Klamath	Klamath R. downstream of Big Bend Powerhouse	219.9	10764	64	70	64
North Coast	Klaskanine R. at Youngs River Loop Road (Olney)	1.3	11904	63	87	63
Willamette - Lower	Tualatin R. at HWY 210 (Scholls)	26.9	10459	71	62	62
Willamette - Lower	Fanno Creek at Bonita Road (Tigard)	2.3	10469	62	64	62
Willamette - Middle	Pudding R. at HWY 99E (Aurora)	8.1	10917	65	60	60

Table 8. Monitored Sites Ranked by Minimum Seasonal Average OWQI Score - Very Poor Category

Basin	Site	River Mile	LASAR Number	Summer Mean	FWS Mean	Minimum Seasonal Average
VERY POOR						
Willamette - Lower	Tualatin R. at Boones Ferry Road	8.6	10456	62	56	56
South Coast	Millicoma R. at Rooke Higgins Boat Ramp	3.6	13570	55	92	55
North Coast	Skipanon R. at HWY 101	4.9	10812	55	79	55
Willamette - Lower	Beaverton Creek at Cornelius Pass Road (Orengo)	0.3	10480	55	63	55
Rogue	Bear Creek at Kirtland Road	0.9	11051	54	58	54
Willamette - Middle	Pudding R. at HWY 211 (Woodburn)	22.4	10640	56	53	53
Malheur	Malheur R. at Little Valley	49.0	11480	51	58	51
Owyhee	Owyhee R. at HWY 201	2.9	10729	50	51	50
Powder	Powder R. at HWY 86	32.1	15566	49	72	49
South Coast	South Fork Coos R. at Anson Rogers Bridge	2.5	13574	45	87	45
Umatilla	Umatilla R. at Westland Road (Hermiston)	8.7	11489	45	67	45
Willamette - Lower	Columbia Slough at Landfill Road	2.6	11201	39	32	32
Klamath	Link R. at Mouth (Entrance to Lake Ewauna)	0.1	10768	31	81	31
Willamette - Lower	Johnson Creek at SE 17th Avenue (Portland)	0.2	11321	28	30	28
Malheur	Bully Creek at HWY 20 (Vale)	2.3	11043	27	30	27
Klamath	Lost R. at HWY 39 (u/s Merrill)	12.1	10759	27	27	27
Klamath	Klamath R. at Keno	234.2	10765	26	66	26
Malheur	Malheur R. at HWY 201 (Ontario)	0.5	10407	23	28	23
Malheur	Willow Creek at RR Xing east of Vale	4.3	10728	23	23	23
Klamath	Klamath Strait Drain at USBR Pump Station F	2.0	10763	19	21	19

Summary Table

The following table (Table 9) summarizes water quality status and trends, using the Oregon Water Quality Index, for sites on the ambient water quality monitoring network. The stream sites are arranged alphabetically within major basins, which are also arranged alphabetically.

Table 9. OWQI Status and Trends Summary

Site	RM	Score	Category	Trend	Magnitude
COLUMBIA RIVER					
Cathlamet Marker 41 Midchannel	37.0	86	g	ID	
Kalama Marker 59 Midchannel	78.0	87	g	ID	
Portland Marker 47 (u/s Willamette)	102.5	81	f	NT	
Warrendale Marker 88 Midchannel	141.0	88	g	ID	
DESCHUTES					
Crooked R. at Conant Basin Road	105.0	78	p	NT	
Crooked R. at Lone Pine Road	29.9	68	p	NT	
Deschutes R. at Deschutes River Park (Mouth)	1.0	83	f	NT	
Deschutes R. at Harper Bridge (Sunriver)	191.7	91	e	Inc.	+3.3
Deschutes R. at Lower Bridge	133.4	77	p	NT	
Deschutes R. at Mirror Pond (Bend)	164.9	91	e	Inc.	+3.4
Deschutes R. at Pringle Falls	217.0	92	e	NT	
Deschutes R. at Warm Springs	96.8	86	g	Inc.	+3.3
Little Deschutes R. at HWY 42	4.0	91	e	NT	
Metolius R. at Bridge 99 (Camp Sherman)	30.3	91	e	Inc.	+1.6
GRANDE RONDE					
Grande Ronde R. at Hilgard St. Park	166.8	87	g	Inc.	+1.7
Grande Ronde R. at HWY 82 (Elgin)	99.0	81	f	NT	
Grande Ronde R. at Peach Lane (Island City)	151.1	75	p	NT	
Minam R. at Minam	0.1	94	e	NT	
Wallowa R. at Minam	10.0	85	g	Inc.	+5.0
HOOD					
Hood R. at Hood River, OR	1	84	f	Inc.	+3.3
JOHN DAY					
John Day R. at HWY 206	39.5	74	p	Inc.	+3.3
John Day R. at Service Creek	157.4	85	g	NT	
John Day R. upstream of Dayville	215.4	78	p	NT	
North Fork John Day R. at Kimberly	0.2	89	g	NT	
South Fork John Day R. at Dayville	0.2	85	g	NT	
KLAMATH					
Klamath R. at Keno	234.2	26	vp	NT	
Klamath R. downstream of Big Bend Powerhouse	219.9	64	p	NT	
Klamath Strait at USBR Pump Station F	2.0	19	vp	NT	
Link R. at Mouth (Entrance to Lake Ewauna)	0.1	31	vp	NT	
Lost R. at HWY 39 (upstream of Merrill)	12.1	27	vp	NT	
Williamson R. at Williamson River Store	4.6	87	g	Inc.	+2.0
MALHEUR					
Bully Creek at HWY 20 (Vale)	2.3	27	vp	NT	
Malheur R. at HWY 201 (Ontario)	0.5	23	vp	NT	
Malheur R. at Little Valley	49.0	51	vp	Inc.	+6.6
Willow Creek at RR Xing east of Vale	4.3	23	vp	NT	
MID COAST					
Alsea R. at Thissell Road	17.7	91	e	Inc.	+2.5
Salmon R. at Otis	2.8	90	e	Inc.	+3.0
Siletz R. 5 miles downstream of Siletz	30.9	92	e	NT	
Siuslaw R. at HWY 126 (Mapleton)	20.5	79	p	Inc.	+3.0
Yaquina R. downstream of Chitwood	24.9	82	f	NT	

RM: River Mile. **Score:** Minimum Seasonal Average. **Category Key:** e: Excellent; g: Good; f: Fair; p: Poor; vp: Very Poor. **Trend Key:** Dec.: Significant Decrease; Inc.: Significant Increase; NT: No significant Trend; ID: Insufficient data available.

Table 9 (continued). OWQI Status and Trends Summary

Site	RM	Score	Category	Trend	Magnitude
NORTH COAST					
Clatskanie R. at HWY 30 (Clatskanie)	4.7	82	f	Inc.	+3.0
Kilchis R. at HWY 101	1	87	g	Inc.	+3.0
Claskanine R. at Youngs River Loop Road (Olney)	1.3	63	p	NT	
Lewis & Clark R. at Stavebolt Lane	7.6	85	g	NT	
Miami R. at Moss Creek Road	1.7	83	f	Inc.	+3.6
Necanicum R. at Forest Lake Camp	5.8	91	e	NT	
Nehalem R. at Foley Road	7.8	85	g	Inc.	+4.0
Nestucca R. at Cloverdale	1.7	86	g	Inc.	+3.9
Skipanon R. at HWY 101	4.9	55	vp	NT	
Tillamook R. at Bewley Creek Road	6.8	73	p	Inc.	+5.4
Trask R. at HWY 101	4.2	87	g	Inc.	+3.0
Wilson R. at HWY 101	1.8	83	f	NT	
Wilson R. at HWY 6	8.5	91	e	ID	
Youngs R. at Youngs River Loop Road	8.9	91	e	NT	
OWYHEE					
Owyhee R. at HWY 201	2.9	50	vp	NT	
POWDER					
Burnt R. downstream of Huntington	1.1	69	p	Dec.	-3.3
Powder R. at Campbell St. (Baker City)	119.3	88	g	Dec.	-2.1
Powder R. at HWY 86	32.1	49	vp	Dec.	-7.8
ROGUE					
Applegate R. at HWY 199	2.6	86	g	NT	
Bear Creek at Kirtland Road	0.9	54	vp	Inc.	+19.9
Illinois R. downstream of Kerby	48.4	90	e	Inc.	+4.9
Little Butte Creek at Agate Road (White City)	1.4	69	p	Inc.	+8.9
Rogue R. at Dodge Park	138.4	92	e	Inc.	+2.0
Rogue R. at Lobster Point Bridge	11.0	88	g	NT	
Rogue R. at Robertson Bridge (Merlin)	86.6	83	f	Inc.	+5.1
Rogue R. at Rock Point Bridge (Gold Hill)	117.3	84	f	Inc.	+1.2
SANDY					
Sandy R. at Troutdale Bridge	3.1	91	e	Inc.	+2.5
SOUTH COAST					
Chetco R. at USGS Gage	10.8	87	g	Inc.	+3.7
Coquille R. at Sturdivant Park Dock	24.5	79	p	Inc.	+10.0
Elk R. at HWY 101	3.4	92	e	Inc.	+4.6
Floras Creek at HWY 101	4.1	81	f	ID	
Middle Fork Coquille R. at HWY 42	0.2	83	f	Inc.	+8.0
Millicoma R. at Rooke Higgins Boat Ramp	3.6	55	vp	ID	
North Fork Coquille R. at HWY 42	0.2	85	g	Inc.	+6.1
Pistol R. at Pistol River Loop Road	1.2	72	p	Inc.	+4.6
Sixes R. at HWY 101	5.5	81	f	Inc.	+3.0
South Fork Coos R. at Anson Rogers Bridge	2.5	45	vp	ID	
South Fork Coquille R. at Broadbent	10.0	84	f	Inc.	+5.6
Winchuck R. upstream of HWY 101	2.5	93	e	Inc.	+3.9
UMATILLA					
McKay Creek at Kirk St. (Pendleton)	1.5	80	f	NT	
Umatilla R. at HWY 11 (Pendleton)	57.1	76	p	NT	
Umatilla R. at Westland Road (Hermiston)	8.7	45	vp	Inc.	+4.0
Umatilla R. at Yoakum	37.2	77	p	NT	

RM: River Mile. **Score:** Minimum Seasonal Average. **Category Key:** e: Excellent; g: Good; f: Fair; p: Poor; vp: Very Poor. **Trend Key:** Dec.: Significant Decrease; Inc.: Significant Increase; NT: No significant Trend; ID: Insufficient data available.

Table 9 (continued). OWQI Status and Trends Summary

Site	RM	Score	Category	Trend	Magnitude
UMPQUA					
Calapooya Creek at Umpqua	0.4	78	p	Inc.	+3.4
Cow Creek at Mouth (Riddle)	0.3	79	p	NT	
Elk Creek at Elkton	0.2	86	g	NT	
North Umpqua R. at Garden Valley Road	1.8	90	e	Inc.	+2.9
South Umpqua R. at Days Creek Cutoff Road	55.5	82	f	NT	
South Umpqua R. at HWY 42 (Winston)	21.2	80	f	Inc.	+3.4
South Umpqua R. at Melrose Road	5.1	65	p	NT	
South Umpqua R. at Stewart Pk Road (Roseburg)	10.7	82	f	Inc.	+2.5
Umpqua R. at Elkton	48.4	87	g	NT	
WILLAMETTE - LOWER					
Beaverton Creek at Cornelius Pass Road (Orengo)	0.3	55	vp	Inc.	+12.0
Clackamas R. at High Rocks	1.2	90	e	Inc.	+5.0
Clackamas R. at McIver Park (Upper Boat Ramp)	22.6	95	e	NT	
Clackamas R. at Memaloose Road	35.7	91	e	NT	
Columbia Slough at Landfill Road	2.6	32	vp	Inc.	+13.1
Fanno Creek at Bonita Road (Tigard)	2.3	62	p	Inc.	+8.0
Johnson Creek at SE 17th Avenue (Portland)	0.2	28	vp	NT	
Swan Island Channel midpoint (Willamette R.)	0.5	78	p	Inc.	+6.6
Tualatin R. at Boones Ferry Road	8.6	56	vp	Inc.	+10.1
Tualatin R. at Elsner Road	16.2	65	p	Inc.	+12.0
Tualatin R. at HWY 210 (Scholls)	26.9	62	p	Inc.	+8.7
Tualatin R. at Rood Bridge	39.0	73	p	Inc.	+9.8
Willamette R. at Hawthorne Bridge	13.2	80	f	Inc.	+6.7
Willamette R. at SP&S RR Bridge (Portland)	7.0	79	p	Inc.	+6.9
WILLAMETTE - MIDDLE					
Mollala R. at Canby	3	89	g	NT	
North Santiam R. at Coopers Ridge Road	63.8	94	e	NT	
North Santiam R. at Gates School Road	39.0	93	e	NT	
North Santiam R. at Green's Bridge	2.9	93	e	NT	
North Yamhill R. at Poverty Bend Road	4.5	75	p	Inc.	+5.4
Pudding R. at HWY 211 (Woodburn)	22.4	53	vp	Inc.	+13.2
Pudding R. at HWY 99E (Aurora)	8.1	60	p	NT	
South Santiam R. at HWY 226 (Crabtree)	7.6	92	e	Inc.	+2.5
South Yamhill R. at HWY 99W	16.5	79	p	Inc.	+4.0
Willamette R. at Canby Ferry	34.4	84	f	Inc.	+7.0
Willamette R. at Newberg Bridge	48.6	83	f	Inc.	+7.5
Willamette R. at Salem	84	86	g	Inc.	+5.0
Willamette R. at Wheatland Ferry	71.9	86	g	Inc.	+6.2
Yamhill R. at Dayton	5.0	70	p	Inc.	+7.5
WILLAMETTE - UPPER					
Blue R. at Blue River Drive	0.3	95	e	NT	
Calapooia R. at Queens Road (Albany)	3.0	74	p	Inc.	+8.7
Coast Fork Willamette R. at Mt. Pisgah Park	3.0	85	g	NT	
Long Tom R. at Stow Pit Road (Monroe)	4.7	76	p	Inc.	+5.0
Mary's R. at HWY 99W (Corvallis)	0.2	84	f	NT	
McKenzie R. at Coburg Road	7.1	92	e	NT	
McKenzie R. at Hendricks Bridge	24.0	93	e	Dec.	-1.2
McKenzie R. at HWY 126 (d/s of Clear Lake)	89.0	94	e	Dec.	-2.0
McKenzie R. at McKenzie Bridge	68.1	95	e	Dec.	-1.5
Middle Fork Willamette R. at Jasper Bridge	8.0	94	e	NT	
Mohawk R. at Hill Road	1.6	86	g	NT	
South Fork McKenzie R. at NF Road 19	3.9	95	e	Dec.	-2.0
Willamette R. at HWY 126 (Springfield)	185.3	92	e	NT	
Willamette R. at HWY 20 (Albany)	119.3	86	g	Inc.	+4.9
Willamette R. at HWY 34 (Corvallis)	131.4	87	g	Inc.	+4.0
Willamette R. at HWY 99E (Harrisburg)	161.2	89	g	Inc.	+2.9

RM: River Mile. **Score:** Minimum Seasonal Average. **Category Key:** e: Excellent; g: Good; f: Fair; p: Poor; vp: Very Poor. **Trend Key:** Dec.: Significant Decrease; Inc.: Significant Increase; NT: No significant Trend; ID: Insufficient data available.