

# Oregon Water Quality Index Data Summary

## Water Years 2009-2018

*(Oct. 1, 2009 through Sept. 30, 2018)*

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State of Oregon  
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# Introduction

This report provides a general statistical overview of water quality status and trends across Oregon through use of the Oregon Water Quality Index (OWQI). The index, which the state of Oregon has calculated for more than three decades, analyzes a defined set of water quality variables and produces scores describing general water quality throughout Oregon's rivers. This report only presents water quality from the rivers of Oregon. It does not include lakes, wetlands, estuaries or groundwater resources. Variables included in the index are dissolved oxygen (percent saturation and concentration), biochemical oxygen demand (BOD), pH, total solids, ammonia and nitrate nitrogen, total phosphorus, temperature and bacteria (*E. coli*). Index scores range from 10 (worst case) to 100 (ideal water quality). DEQ uses the index to communicate information on the overall water quality of Oregon's rivers in an easy-to-understand, non-technical manner to the public, agency managers and the Oregon Legislature.

For this report, DEQ calculated water quality index results on all samples meeting data quality and quantity requirements collected from Oct. 1, 2009 through Sept. 30, 2018. DEQ calculated seasonal averages for the summer season (June to September) and fall-winter-spring season (October to May) and used the minimum of these seasonal 10-year averages for scoring purposes. Once scored, sites were given a status designation varying from excellent to very poor. Sites with sufficient data (30 or more scores) were analyzed for significantly improving or declining 10-year trends using the nonparametric Seasonal-Kendall test, which factors in normal seasonal variation. DEQ reports the magnitude and direction of significant trends at the 80 percent or greater confidence level. For more information on the reporting methods and uses of the index as well as an interactive map showing site locations, status and trends visit <http://www.oregon.gov/deq/wq/Pages/WQI.aspx>.

## 2018 Water Quality Status and Trend

### Status

Oregon Water Quality Index results for water years 2009-2018 show 51 percent of sites in excellent or good status, 16 percent in fair and 33 percent in poor or very poor status for the statewide ambient monitoring network of 160 sites (Figure 1). Three sites reported on in 2015 and 2016 were a part of a special study and were dropped from the ambient network at the completion of the study.

### Trend

In 2018, four of the 19 sites added to the ambient network in 2012 or 2013 reached the required amount of data to be included in the trend analysis (30 or more scores) compared to 14 sites included in the 2017. This increased the number of ambient sample sites with sufficient data to calculate trends to 149. Of the 149 trendable sites, 30 percent showed improving water quality, while nine percent had declining water quality. Of the sites with improving trends, 36 percent are categorized as fair to very poor status. This is down slightly from 37 percent last year, which is encouraging as continued upward trends may result in improved water quality status for these sites. On the other hand, four of

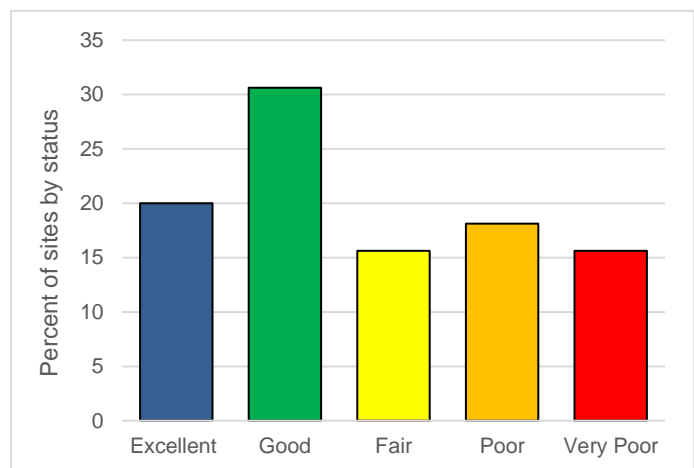


Figure 1. Percent of sites with scores in each Oregon Water Quality Index status.

the fourteen sites with declining water quality are in good status and should be evaluated further to avoid a decrease in water quality status. The remaining 61 percent of sites have no statistically significant trend.

## New Trend Sites

As mentioned above, four sites reached the required amount of data to be included in trend analysis during the 2018 water year, however no significant trend was identified at any of these locations. Each of these sites were added to the ambient monitoring network in either 2012 or 2013 in conjunction with Oregon Department of Agriculture. These sites improved the spatial coverage of the OWQI and provided important information on state waters in agricultural areas for ODA. While these sites are in their first year of trend analysis, the status of these sites has been included in previous OWQI data summaries. Table 1 indicates the status of these sites since their inclusion in the ambient monitoring network.

**Table 1. Status of new trend sites from the date established.**

Station	Location Description	Basin	Land Use	Water Year Range	OWQI Status							
					2012	2013	2014	2015	2016	2017	2018	
10663	Mohawk R. at Hill Rd.	Willamette - Upper	Mixed	2013-18		Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent
11047	Malheur River at HWY 20 (Drewsey)	Malheur	Range	2012-18	Very Poor	Very Poor	Very Poor	Very Poor	Very Poor	Very Poor	Very Poor	Very Poor
11050	Jordan Creek at Arock Rd	Owyhee	Range	2012-18	Poor	Poor	Poor	Poor	Poor	Poor	Poor	Poor
36778	Thomas Creek at Stock Drive Rd	Oregon Closed Lakes	Agriculture	2012-18	Poor	Poor	Poor	Poor	Poor	Poor	Poor	Poor

# Where are we seeing improving and declining water quality?

Sites with significantly improving water quality index trends in 2018 were spread across the state (Table 2). The site that showed the greatest improvement, based on the magnitude of the trend, was Rhea Creek in the Umatilla Basin. This the second consecutive year in which this site has had a double-digit improving trend. While some sites improve consistently over a number of years, nine sites are showing an improving trend for the first time in five or more years. The average improving trend magnitude was higher at sites in fair to very poor status than at sites in good or excellent status indicating that the largest gains in water quality occurred at sites most in need of improvement (Excellent or Good, n = 28,  $\bar{x}$  = 2.32, Fair to Very Poor n = 16,  $\bar{x}$  = 3.79).

**Table 2. Sites monitored by DEQ showing significant improving trends in water quality for water years 2009-2018. Sites are listed by basin. Magnitude indicates the rate of change (i.e. higher numbers equal more rapid change). For the five-year trend, blue or red squares indicate improving or declining trends.**

Station	Location Description	Land Use	Water Year Range	OWQI Score	OWQI Status	OWQI Trend and Magnitude	Trend for Past 5 Reporting Years	Sub-Index Status and Trend									
								Temp	pH	DO	BOD	TS	N	P	Bact		
<b>DESCHUTES BASIN</b>																	
10508	Deschutes R at Lower Bridge	Range	2009-18	86	Good	↑ 2.1	■ ■ ■ ■ ■	■	■	↓	↑	■	■	■	■	■	■
10511	Deschutes R at Mirror Pond (Bend)	Mixed	2009-18	92	Excellent	↑ 1.5	■ ■ ■ ■ ■	■	■	■	■	■	■	■	■	■	■
10517	Crooked R at Lone Pine Rd	Range	2009-18	75	Poor	↑ 2.6	■ ■ ■ ■ ■	■	■	↓	↑	■	■	■	■	■	■
10688	Deschutes R at Pringle Falls	Forest	2009-18	92	Excellent	↑ 1.3	■ ■ ■ ■ ■	■	■	■	■	■	■	■	■	■	■
10690	Metolius R at Bridge 99 (Camp Sherman)	Forest	2009-18	91	Excellent	↑ 0.9	■ ■ ■ ■ ■	■	■	↓	↑	■	■	■	■	■	■
10696	Little Deschutes R at HWY 42	Forest	2009-18	91	Excellent	↑ 1.7	■ ■ ■ ■ ■	■	■	■	■	■	■	■	■	■	■
<b>GRANDE RONDE BASIN</b>																	
10410	Wallowa R at Minam	Forest	2009-18	86	Good	↑ 4.9	■ ■ ■ ■ ■	■	■	■	■	■	■	■	■	■	■
10719	Grande Ronde R at HWY 82 (Elgin)	Mixed	2009-18	84	Fair	↑ 4.1	■ ■ ■ ■ ■	■	■	■	■	■	■	■	■	■	■
10720	Grande Ronde R at Hilgard St Park	Forest	2009-18	87	Good	↑ 2.0	■ ■ ■ ■ ■	■	■	■	■	■	■	■	■	■	■
11457	Minam R at Minam	Forest	2009-18	95	Excellent	↑ 3.3	■ ■ ■ ■ ■	■	■	■	■	■	■	■	■	■	■





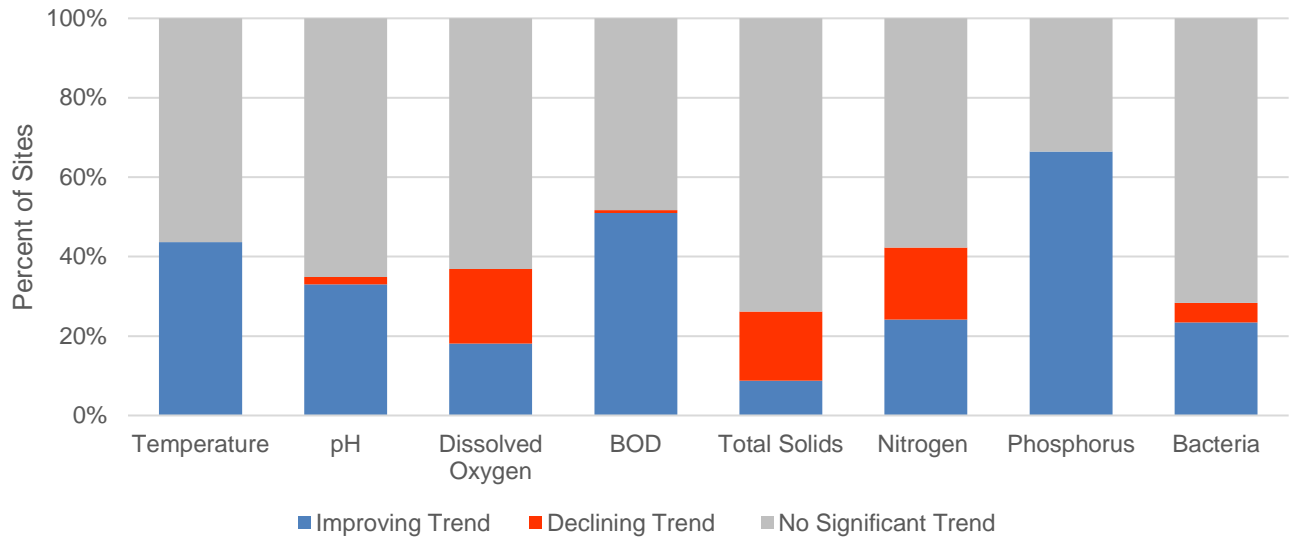


Figure 2. Sub-index trends for the 2018 water year (October 1, 2017 to September 30, 2018).

## How does land use influence status?

Land use type is determined based on the dominant land use in a five-mile buffer upstream of the monitoring site. The mixed land use type was assigned when none of the other four land use designations made up more than 50 percent of the five-mile buffer.

The forest land use type continues to have the highest percentage of excellent and good status sites, while the urban and agriculture land use types have the highest percentage of sites in fair to very poor status. While more than 50% of the sites in both the range and mixed land use types are in fair to very poor status, both have a considerable proportion of sites in good status

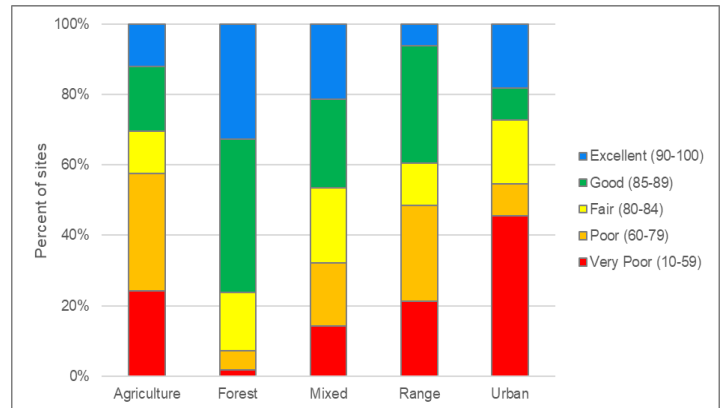


Figure 3. Influence of land use on water quality.

## Want more information on the Oregon Water Quality Index?

Visit <http://www.oregon.gov/deq/wq/Pages/WQI.aspx> for links to these resources:

- Interactive map showing 2009-2018 status and trends for all monitoring sites
- Downloadable data summaries for all sites organized by basin
- Document on Reporting Methods and Uses of the Oregon Water Quality Index
- Downloadable Excel file of 2018 Raw data and historical status and trends
- Documentation of the development and calculations methods of the index