Oregon Water Quality Index Data
Summary
Water Years 2006-2015
(Oct. 1, 2006 through Sept. 30, 2015)

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Introduction

This summary 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. Only river water quality is presented in this report. 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). OWQI scores range from 10 (worst case) to 100 (ideal water quality). Oregon DEQ uses the index to communicate information on 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 criteria collected during Water Years 2006-2015 (Oct. 1, 2006 through Sept. 30, 2015). DEQ calculates seasonal OWQI averages for the summer season (June to September) and fall-winter-spring season (October to May) and uses the minimum of these seasonal 10-year averages for scoring purposes. Once scored, sites are given a status designation varying from excellent to very poor. Sites with sufficient data (n >30 scores) are analyzed for significantly improving or declining 10-year trends using the nonparametric Seasonal-Kendall test which factors in the 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.deq.state.or.us/lab/wqm/wqimain.htm.

2015 Water Quality Status and Trend

Status

Oregon Water Quality Index results for water years 2006-2015 show 48 percent of sites in excellent or good status, 17 percent in fair and 35 percent in poor or very poor status for the statewide ambient monitoring network of 163 sites (Figure 1).

Trend

Of the 131 ambient monitoring network sample sites with sufficient data to calculate trends (n ≥ 30 scores), 21 percent show improving water quality, while 6 percent have declining water quality. Of the sites with improving trends, 53 percent are categorized as fair to very poor status. This is encouraging as continued upward trends may result in improved water quality status for these sites. On the other hand, four of the eight sites with declining water quality are in excellent and good status and should be evaluated further to avoid a decrease in water quality status. The remaining 73 percent of sites have no statistically significant trend.

Figure 1. Percent of sites with scores in each Oregon Water Quality Index status.
Where are we seeing improving and declining water quality?

Sites with significantly improving water quality index scores in 2015 were spread across the state. The sites in the Klamath basin have the greatest improvements in water quality, based on the magnitude of the trend, with all sites showing improving trends in the nitrogen sub-index. Many of these sites are in poor or very poor status (10 out of 28 sites; Table 1), indicating that the largest gains in water quality occurred at sites with the most room for improvement. Statewide, seven of the 28 sites with improving OWQI scores in 2015 have improving trends for three or more years in a row (Table 1).

Table 1. Sites monitored by DEQ showing significant improving trends in water quality (OWQI) for water years 2006-2015. Sites are listed by basin in alphabetical order. Magnitude indicates the rate of change (i.e. higher numbers equal more rapid change). For the 5 year trend, blue or red squares indicate improving or declining trends.
While sites with significantly declining water quality index scores in 2015 are also spread across the state, they are less prevalent. In the 2006-2015 results four sites, in the lower Deschutes, upper Grande Ronde and upper Willamette basins, show declining trends for four or more consecutive years (Table 2). The declining trends at these locations appear to be persistent and further investigation should be conducted.

Table 2. Sites monitored by DEQ showing significant declining trends in water quality (OWQI) for water years 2006-2015. Sites are listed by basin in alphabetical order.

<table>
<thead>
<tr>
<th>Station</th>
<th>Location Description</th>
<th>Land Use</th>
<th>Water Year Range</th>
<th>OWQI Score</th>
<th>OWQI Condition</th>
<th>OWQI Trend and Magnitude</th>
<th>Trend for Past 5 Reporting Years</th>
<th>OWQI Sub-index Status and Trend</th>
</tr>
</thead>
<tbody>
<tr>
<td>10411</td>
<td>Deschutes R at Deschutes R Park (Mouth)</td>
<td>Range</td>
<td>2006-15</td>
<td>84</td>
<td>Fair</td>
<td>↓ -3.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10506</td>
<td>Deschutes R at Warm Springs</td>
<td>Range</td>
<td>2006-15</td>
<td>86</td>
<td>Good</td>
<td>↓ -1.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10720</td>
<td>Grande Ronde R at Hilgard St Park</td>
<td>Forest</td>
<td>2006-15</td>
<td>88</td>
<td>Good</td>
<td>↓ -2.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>34019</td>
<td>Nehalem R at Birenkfeld</td>
<td>Forest</td>
<td>2007-15</td>
<td>85</td>
<td>Good</td>
<td>↓ -2.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10729</td>
<td>Owyhee R at HWY 201</td>
<td>Agriculture</td>
<td>2006-15</td>
<td>39</td>
<td>Very Poor</td>
<td>↓ -1.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10724</td>
<td>Powder R at HWY 86</td>
<td>Range</td>
<td>2006-15</td>
<td>44</td>
<td>Very Poor</td>
<td>↓ -1.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13574</td>
<td>S Fk Coos R at Anson Rogers Bridge</td>
<td>Forest</td>
<td>2006-15</td>
<td>78</td>
<td>Poor</td>
<td>↓ -1.8</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Why is water quality improving or declining?**

Trending analysis of the water years 2006-2015 data show a greater proportion of sites with improving trends for phosphorus than any other sub-index variable with 56 percent of the sites with improving trends, followed by nitrogen and temperature with 38 percent of the sites with improving trends (Figure 2). Total solids and dissolved oxygen have the greatest percentage of sites with declining trends, both at 19 percent. With the exception of phosphorus, most sites showed no significant improving or declining 10-year trends for all other sub-indexes.
How does land use influence status?

Comparing the percent of sites in each water quality status to dominant land use in a five mile buffer upstream of the monitoring site shows that rivers and streams in urban and agriculture areas have the greatest number of sites in poor to very poor water quality.

What more information on the Oregon Water Quality Index?

Visit http://www.deq.state.or.us/lab/wqm/wqimain.htm for links to these resources:

- Interactive map showing 2006-2015 status and trends for all monitoring sites
- Downloadable data summaries for all sites organized by basin
- Document on Reporting Methods and Uses of the OWQI
- Downloadable Excel file of 2015 Raw data and historical status and trends
- Documentation of the development and calculations methods of the index