



## Section 319

# NONPOINT SOURCE PROGRAM SUCCESS STORY

# Oregon

## Watershed Approach Reduces Pollution in the Tualatin River

### Waterbodies Improved

Nonpoint and point sources of pollution caused water quality problems in Oregon's Tualatin River basin. As a result, between 1998 and 2002 the Oregon Department of Environmental Quality (ODEQ) added 31 segments to the state's Clean Water Act section 303(d) list of impaired waters for one or more of the following pollutants: temperature, bacteria, dissolved oxygen, chlorophyll *a*, toxics (arsenic, iron and manganese), biological criteria and low pH. Using a watershed-based approach, stakeholders have upgraded wastewater treatment plants, restored riparian areas, and implemented agricultural and urban best management practices (BMPs). Data show that levels of many pollutants have declined significantly.

### Problem

The Tualatin River drains 27 sub-basins across a 712-square-mile area and empties into the Willamette River in the northwest corner of Oregon (Figure 1). The basin is fairly evenly divided among forest (39 percent), agriculture (35 percent) and urban (26 percent) land uses.

Wastewater treatment plant discharge and runoff from agricultural, forested and urban areas contributed multiple pollutants to the Tualatin River. Low dissolved oxygen, elevated pH and high chlorophyll *a* levels in the river prompted ODEQ to develop total maximum daily loads (TMDLs) for ammonia and phosphorus in 1988. In 2001 ODEQ revised those TMDLs and developed new TMDLs for additional parameters (temperature, bacteria and dissolved oxygen). By 2002, 31 segments across 27 Tualatin River sub-basins had been identified as impaired for one or more parameters.

### Project Highlights

Efforts to improve water quality have been underway over the last few decades. The Tualatin River Watershed Council (TRWC), a local watershed stewardship organization, has been working with landowners to implement restoration projects since 1993. In 2001 ODEQ and other watershed stakeholders developed the *Tualatin River Water Quality Management Plan*, which outlined a strategy for achieving the load allocations outlined in the basin's TMDLs.

The Oregon Watershed Enhancement Board (OWEB), a state agency led by a 17-member citizen board, uses funds from the Oregon Lottery, federal programs and salmon license plate revenue to provide watershed restoration grants. Between 2004 and 2009, the OWEB grant program supported 186 Tualatin River basin projects to restore



Photo by M.O. Stevens

Figure 1. The lower Tualatin River, near Sherwood, Oregon.

and protect stream channels and riparian, upland, wetland and urban areas.

In 2004 Clean Water Services (CWS), a special service district that provides wastewater and stormwater services to more than 520,000 people, was issued a watershed-based National Pollutant Discharge Elimination System (NPDES) permit. The permit provides unique opportunities for CWS to improve the water quality in the Tualatin River basin by allowing the trading of carbonaceous biological oxygen demand and nitrogenous oxygen demand within and between the four wastewater treatment plants (WWTPs).

The permit enables CWS to generate water quality credits by planting riparian areas in the rural and urban portions of the basin and augmenting stream flow. The credits are used to offset the excess thermal loads from the WWTPs. Between 2004 and 2010, CWS implemented 44 projects (covering 17.1 stream miles) in urban areas. The projects included riparian planting and stream enhancement activities. In rural areas, CWS contracted with the Tualatin

Soil and Water Conservation District (SWCD) to provide incentives (rental payments and restoration assistance teams) that encouraged landowners to enroll in a modified version of the U.S. Department of Agriculture's (USDA's) Conservation Reserve Enhancement Program and Vegetated Buffer Areas for Conservation and Commerce Program. Between 2004 and 2010 CWS and the Tualatin SWCD used those programs to implement 33 riparian planting projects in rural areas, which revegetated 19.3 stream miles, thereby reducing in-stream temperature and generating 329 million kilocalories of shade credit. The riparian planting efforts also help to filter stormwater runoff and reduce erosion, thereby reducing the levels of phosphorus, sediment and bacteria reaching surface waters.

From 2007 to 2011, the Tualatin SWCD worked with landowners to complete 30 farm water quality plans covering almost 1,500 acres. The USDA Natural Resources Conservation Service (NRCS), Tualatin SWCD, Metro Regional Government, and the U.S. Fish and Wildlife Service (USFWS) implemented more than a dozen wetland restoration projects covering more than 1,000 acres.

## Results

Thanks to a basin-wide restoration effort, water quality in the Tualatin River watershed has significantly improved since the first TMDLs were adopted in 1988. The incidence of algae blooms in the lower river has decreased, as demonstrated by lower chlorophyll *a* concentrations, no pH violations and higher minimum dissolved oxygen levels. These improvements coincide with lower total phosphorus concentrations, which now meet the 2001 TMDL phosphorus targets in the mainstem Tualatin River. In 2011 CWS performed trend analyses on total phosphorus, bacteria and chlorophyll *a* data collected from 1992 through 2011. A seasonal Kendall trend test showed significantly improving trends (at a 90 percent confidence level or greater) in one or more pollutants contributing to impairments in 20 of 27 Tualatin River sub-basins (Figure 2). Data show that some segments listed as impaired now meet TMDL targets or water quality standards for one or more parameters. Oregon will begin investigating whether these parameters may be removed as sources of impairment from listed segments in an upcoming assessment cycle.

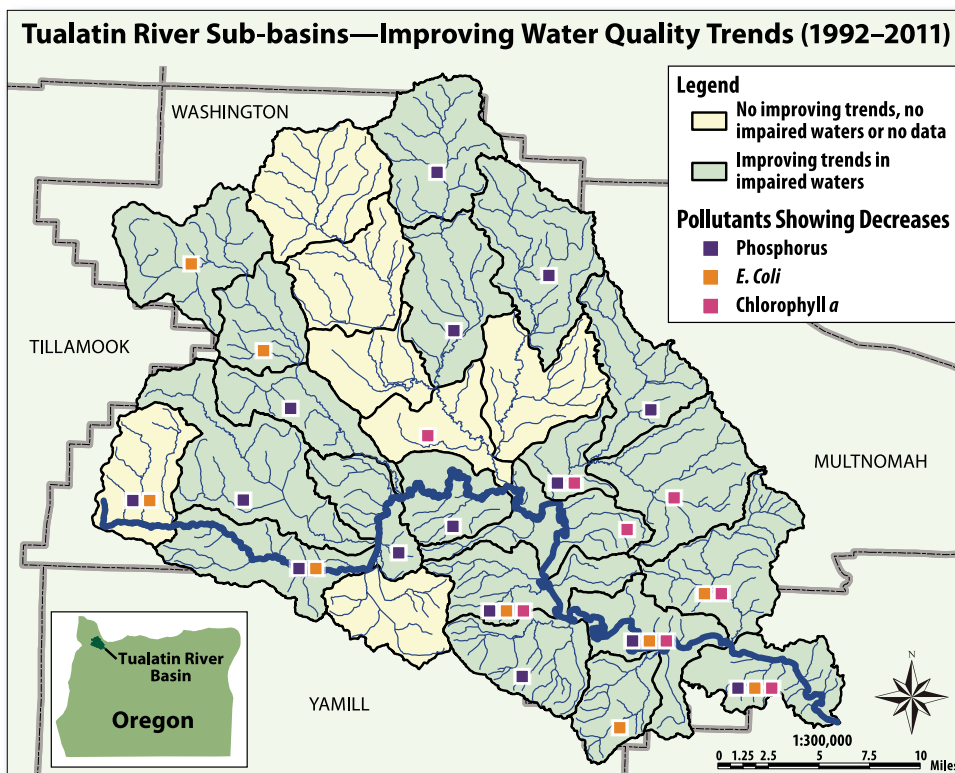


Figure 2. Water quality has improved throughout much of the Tualatin River watershed.

## Partners and Funding

Many agencies and organizations have contributed to the restoration of the Tualatin River basin, including the ODEQ; CWS; NRCS; OWEB, USFWS, Tualatin SWCD; TRWC; Tualatin Riverkeepers; Oregon Department of Agriculture; Oregon Department of Forestry; Multnomah, Clackamas and Washington counties; and the cities of Portland, West Linn and Lake Oswego. Between 1991 and 2001, ODEQ provided more than more than \$300,000 in section 319 funds to support BMP implementation and education projects. Between 1996 and 2009, OWEB partnered with basin groups, federal and state agencies, and landowners to invest \$7 million (plus another \$870,000 in-kind matching funds) in restoration projects. CWS spent \$325 million to upgrade its WWTPs (in response to the 1988 TMDL), and spent an estimated \$10 to \$12 million to implement restoration projects between 2005 and 2009.



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