Section 319 NONPOINT SOURCE PROGRAM SUCCESS STORY

Oregon

Stakeholders' Watershed Approach Reduces Phosphorus Levels

Waterbodies Improved

Urban, forested and agricultural areas contributed nutrients and other pollutants to Oregon's Bear Creek, prompting the Oregon Department of Environmental Quality (ODEQ) to add 26.3 miles of Bear Creek and some of its main tributaries to the state's Clean Water Act (CWA) section 303(d) list of impaired waters in 1998. To address the problem, watershed stakeholders upgraded a wastewater treatment plant (WWTP), educated landowners, and implemented numerous agricultural and urban best management practices (BMPs). Phosphorus levels have dropped steadily over time in Bear Creek and in four tributaries, showing that ongoing watershed-wide nonpoint source (NPS) pollution-reduction efforts are improving water quality. Although the data indicate measurable progress toward achieving water quality goals, these waterbodies do not yet meet water quality standards and remain on Oregon's list of impaired waters for phosphorus and/or other pollutants.

Problem

Bear Creek (Figure 1) empties into the Rogue River in southwest Oregon. The 362-square-mile Bear Creek watershed includes approximately 290 miles of streams. Another 250 miles of irrigation canals transport water to farms across the watershed. Land use in the watershed is approximately 18 percent urban, 35 percent agriculture and 46 percent forest.

Pollutants from numerous sources have contributed to problems in the Bear Creek watershed for decades. NPS pollution (irrigation return flows and runoff from agricultural and developed areas) have contributed nutrients, sediment and fecal coliform to surface waters. A WWTP along Ashland Creek, a headwaters tributary of Bear Creek, also contributed high levels of nutrients in its effluent.

A combination of point and NPS pollution sources led to low pH, low dissolved oxygen levels, excessive amounts of aquatic weeds, and high levels of fecal coliform in numerous waterbodies in the Bear Creek watershed. As a result, ODEQ added 26.3 miles of Bear Creek and numerous tributaries to the state's CWA section 303(d) list of impaired waters in 1998. The pollutants of concern for Bear Creek include phosphorus, dissolved oxygen, chlorophyll *a*, pH, ammonia, temperature and fecal coliform. ODEQ listed Ashland Creek as impaired in 1998 because of fecal coliform, ammonia and phosphorus. Other tributaries were added to the state's list of impaired waters the same year for a variety of pollutants, including fecal coliform, temperature and dissolved oxygen.

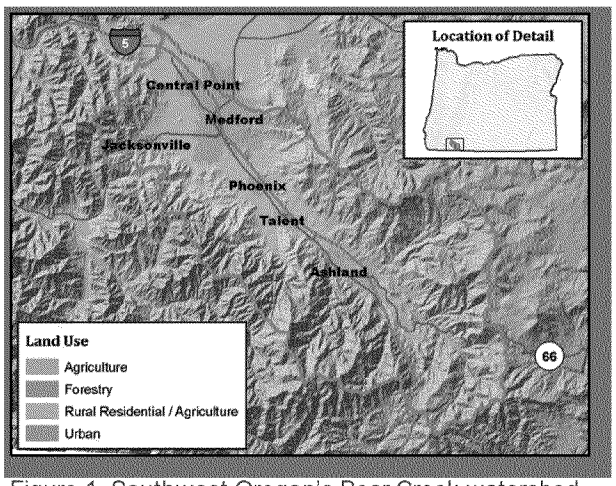

Figure 1. Southwest Oregon's Bear Creek watershed includes a mix of urban, agricultural, rural residential and forested areas.

Project Highlights

Many partners have cooperated to identify and implement pollution-reduction efforts. ODEQ developed total maximum daily loads (TMDLs) for Bear Creek in 1992 (for pH, dissolved oxygen and aquatic weeds/algae) and in 2007 (for temperature, sediment and fecal coliform). The Rogue Valley Council of Governments (RVCOG) and the Bear Creek Watershed Council completed a Watershed Assessment and Action Plan for Bear Creek (in 1995) and for its tributaries (in 2001). In 2005 the Oregon Department of Agriculture (ODA) and the Bear Creek Local Advisory Committee developed an agricultural water quality management area plan to address agriculture-related water quality issues.

The Medford and Talent irrigation districts reduced sediment and nutrients from irrigated lands by converting flood irrigation to sprinkler irrigation and adding protective liners along canals or replacing the canals with pipes to reduce erosion. The Jackson Soil and Water Conservation District (SWCD) and the U.S. Department of Agriculture's (USDA) Natural Resources Conservation Service (NRCS) are helping farmers to implement agricultural BMPs such as nutrient management, exclusion fencing (typically to prevent livestock from accessing riparian areas), pesticide management, pasture fencing and pasture management.

The RVCOG facilitates the local communities' efforts to conduct regional stormwater management planning; it also implements demonstration projects, educates watershed residents about water quality issues, and encourages participation in corrective actions. In 2002 Ashland upgraded its WWTP by adding a tertiary treatment phosphorus removal system that operates from May until November each year. Municipalities installed stormwater control practices, including adding a large stormwater treatment wetland in Ashland.

Results

Water quality has measurably improved since 1996. The 1992 Bear Creek TMDL established that the in-stream concentration of total phosphorus must be less than 0.08 milligram per liter (mg/L) from May 1 through November 15 to meet water quality standards. Although Bear Creek and its tributaries do not yet meet this goal consistently, significant progress had been made.

Data from monitoring stations in the Bear Creek watershed (main stem and tributaries) show that phosphorus levels are steadily declining. At Bear Creek river mile 10 in Medford, for example, phosphorus levels have declined from an average high of 0.33 mg/L in July/August 1996–1998 to an average low of 0.08 mg/L in September/October 2008–2009 (Figure 2). In Ashland Creek, upgrading the WWTP contributed to large phosphorus decreases in Ashland Creek and the upper main stem of Bear Creek (Ashland Creek joins Bear Creek at river mile 24). Declines in phosphorus levels in other, NPS pollution-dominated Bear Creek tributary watersheds such as Neil Creek (which joins Bear Creek at river mile 27), indicate that efforts to reduce NPS pollution are also contributing to lower phosphorus levels seen in Bear Creek. Data show that Neil Creek's phosphorus levels have declined from an

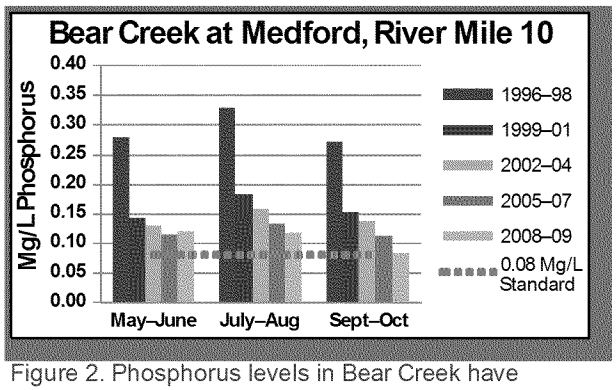

Figure 2. Phosphorus levels in Bear Creek have declined over time and almost meet water quality standards.

average high of 0.23 mg/L in May/June 1996–1998 to an average low of 0.07 mg/L in September/October 2008–2009. Other NPS-dominated Bear Creek tributaries showing declining phosphorus levels include Griffin Creek and Jackson Creek.

Partners and Funding

Many agencies and organizations, including the RVCOG, the Bear Creek Watershed Council and Local Advisory Committee, ODEQ, ODA, Oregon Department of Forestry, Oregon State University, USDA's NRCS and Farm Service Agency, Jackson SWCD, local irrigation districts (Talent, Medford and Rogue River Valley), Rogue Valley Sewer Services, and local municipalities, are working to restore the Bear Creek watershed. Jackson County and the cities of Medford, Ashland, Phoenix, Central Point, Jacksonville and Talent provide financial support to the RVCOG for the ongoing Bear Creek water quality monitoring program.

Since 1997, stakeholders have spent more than $39.5 million on water quality improvement projects within the Bear Creek watershed. Ashland upgraded its WWTP for $33.6 million. The Oregon Watershed Enhancement Board provided more than $715,000 for restoration and watershed management projects by the Jackson SWCD, the RVCOG and the Bear Creek Watershed Council. Support for irrigation system upgrades was provided by the Bureau of Reclamation (more than $1.575 million) and Talent and Medford irrigation districts (more than $2.2 million). Landowners contributed more than $1 million to support irrigation upgrades. ODEQ's Water Resources Department provided more than $430,000 in CWA section 319 funding to support a variety of NPS pollution-reduction projects.

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