

Case Study: Albany-Millersburg Talking Water Gardens A Value-Focused Approach to Improving Water Quality

In 2006, the Oregon Department of Environmental Quality (DEQ) adopted new total maximum daily loads (TMDL) for temperature, bacteria, and mercury in the Willamette River. As part of an effort to meet the new TMDLs, the cities of Albany and Millersburg worked together to design and fund a project that addresses wastewater treatment from a natural hydrological perspective. The Talking Water Gardens project involved creating 37 acres of constructed wetlands (see picture below) and was partially funded through \$8 million received through the Oregon Clean Water State Revolving Fund (CWSRF), with \$5 million in principal forgiveness as authorized in the American Recovery and Reinvestment Act (ARRA)¹. This project demonstrates the value of cooperative planning, as well as the long-term environmental benefits of taking a “value-focused” approach to meeting water quality challenges.

An Innovative Solution to Wastewater Treatment

The Talking Water Gardens project was designed to help Albany and Millersburg meet the newly established temperature TMDL limits for the Willamette River. The objective of the TMDL is to enhance the fish passage through that area, protecting a threatened salmonid species. The Talking Water



Constructed wetlands at Talking Water Gardens

Gardens will serve as the final treatment step for wastewater effluent before it is discharged to the river. Treated wastewater from the Albany-Millersburg Water Reclamation Facility (WRF) and from an ATI Wah Chang facility, a local manufacturer of specialty metals, is piped to the Talking Water Gardens wetlands park. Here, the effluent is further treated through natural hydrological processes in the wetlands, thereby discharging cooler and cleaner water to the river. The 37 acres of constructed wetlands serve as an environmentally beneficial alternative to more traditional wastewater treatment methods; the project developers estimate that the wetlands treatment alternative will provide approximately 2.5 times more value in ecological services than a conventional treatment alternative.

There are three major components to the water treatment processes at the Talking Water Gardens project: wetland cells, waterfalls and weirs, and plantings of wetlands vegetation. The movement of water through these components will cool the water while removing nutrients through microbial conversion, volatilization, adsorption, and deposition. Wetland cells one to five feet deep will provide habitat and a location for emergent vegetation. The nine waterfalls and weirs will aerate and mix water,

¹ The Oregon Department of Environmental Quality did not count the Albany-Millersburg Talking Water Gardens project towards the 20% ARRA GPR requirement; however the project is an eligible GPR project.

cooling it and encouraging the growth of plants and organisms that prevent erosion and consume excess nutrients. These waterfalls are also the namesake of the park. Plantings of wetlands vegetation throughout the site will help to prevent erosion, increase the aesthetic value and biodiversity of the habitat, and provide shade to reduce water temperature in the wetland cells. The wetland plants are expected to reach maturity by 2013. Trails and signage are planned to be added to encourage the use of the Talking Water Gardens as an outdoor recreation destination.

The implementation of a wetland treatment system was determined to maximize the environmental benefits for this area. A Net Environmental Benefits Analysis calculated that the environmental value of this project was 2.5 times that of a conventional treatment option for meeting the TMDL, based on attributes such as habitat disturbance, groundwater recharge and habitat diversity. In addition, the wetland treatment system is expected to remove thousands of additional pounds of nutrients annually that would otherwise have been discharged to the river. For example, sixty percent more biochemical oxygen demand (also referred to as dissolved oxygen) will be removed than is required under the most restrictive regulatory limit, lead will be removed to 81 percent below the regulatory limit, and nickel will be removed to 94 percent below the regulatory limit. Other pollutants that will be removed beyond the most restrictive regulatory limits include chromium, zinc, mercury, and oil and grease.

Another benefit of the Gardens is that it will create a variety of habitats for wetland or aquatic species, increasing biodiversity and providing nesting sites for native and migratory bird species. The site is also designed to educate and inform residents about the project, the river and the water cycle. In this way the unique design of this project is expected to have numerous long-term environmental and social benefits.

The Decision Process: A Value-Focused Approach

The decision to meet TMDL limits through a collaborative and nontraditional project was made by taking a “value-focused” approach to the challenges faced by the Cities of Albany and Millersburg. Rather than focusing on technology costs, the analysis began with looking at the challenges and desired outcomes for each of the municipalities. Following this, the desired outcomes of other stakeholders were considered, including local industry, with the goal of maximizing the economic, social and environmental benefits for the area.

Several projects were considered to meet the goal of cooling the treated effluent, including treatment plant upgrades, storage and cooling towers, refrigeration, land application and new outfall diffusers. Additionally, both individual and integrated treatment wetlands were considered as possibilities. The wetland treatment options underwent three tests to determine their effectiveness and sustainability. The tests examined the impact on thermal reduction, the treatment of other contaminants, and net environmental benefits compared to traditional treatment systems. Long-term management requirements also had to be considered, such as vegetation management and the need to maintain a relatively balanced flow. Overall, an integrated wetland was determined to be the most effective, sustainable long-term solution to the new regulatory challenges.

The Value of Cooperative Project Planning

A key component of the success of the Talking Water Gardens project was the coordination between the two municipalities and with the private sector. Because Albany and Millersburg share the Albany-Millersburg WRF, they had to work together to determine how best to comply with the TMDL. The two cities have separate priorities and challenges but had to find a mutually satisfactory and beneficial approach.

The public/private partnership between the Albany-Millersburg WRF and the ATI Wah Chang facility further demonstrates the collaborative approach used in the development of this project. The interests of all these stakeholders were brought into consideration as the project was developed. For instance, it was discovered that synergies could be created by combining the discharges from both facilities into a single source, which feeds the wetlands. Although many options were considered for projects that would improve the quality of this discharge, the advantages of a public/private partnership to meet DEQ's TMDL for the Willamette River were immediately apparent. By combining resources, it would be possible to maximize the social and sustainability benefits of the project, as well as the value to the local economy. The total cost of this phase of the project is \$13.75 million. The project received \$8 million in ARRA CWSRF funding while ATI Wah Chang contributed \$3.25 million, and the cities each contributed another \$2.5 million. A second phase costing approximately \$5 million will be put towards developing visitor facilities.

For more information contact the Oregon Clean Water State Revolving Fund Program
<http://www.deq.state.or.us/wq/loans/loans.htm>