

Prado Wetlands

The Orange County Groundwater Basin is managed by the Orange County Water District (OCWD; the District) and provides about 75 percent of the water for 2.5 million residents in north and central Orange County. OCWD owns 2,150 acres behind Prado Dam in Riverside County where it operates the Prado Wetlands, the largest constructed wetlands on the west coast of the United States. The wetlands naturally remove nitrates and other contaminants from Santa Ana River (SAR) flows.

Restoring Water Quality

The Santa Ana River flow, during non-storm seasons, consists primarily of highly-treated wastewater from upstream communities. Half of the Santa Ana River flow is captured behind Prado Dam and is routed through a specially-constructed wetland area. By putting the river water through this network of ponds behind Prado Dam, OCWD has created a natural, cost-effective process for reducing nitrate levels and purifying the water for future percolation into the groundwater basin.

OCWD's Prado Wetlands include 45 shallow ponds that are constructed in the 450-acre treatment wetland on OCWD land behind Prado Dam.

In the early 1990s, research was conducted to determine what water quality benefits would occur if part of the Santa Ana River flow passed through the wetlands. Research conducted by scientists from Northwestern University and the University of California, Berkeley investigated the effectiveness of the wetlands to naturally remove nitrate, the fate of the nitrogen removed, and the effects of various wetland modifications. The results from the studies indicated that the wetlands are a very effective and economical means for nitrate removal. Nitrate removal at a conventional treatment plant would cost approximately \$15 per pound, compared to about \$0.85 per pound using the natural wetlands process. The wetlands currently remove nearly 175 tons per year from the Santa Ana River.



The wetlands project allows OCWD to improve water quality above and beyond regulatory requirements. By taking this proactive and innovative approach, OCWD improves groundwater quality, enhances the environment and minimizes treatment costs. A permit from the Corps allows half of the flow of the Santa Ana River, about 80 cubic feet per second (cfs), to be diverted through the wetlands. In the late-1990s, OCWD reconstructed its wetlands to maximize the capability to treat river flows and to improve operational efficiency.

The proximity of the wetlands to the SAR in the Prado Basin is necessary for conveyance of water through treatment ponds, but exposes the ponds to flooding from storm flows in the Santa Ana River. Rain events in late December 2010 dramatically increased the storm flows and the stage height of the river rose by 12 feet. This caused the levees protecting the ponds to fail in several locations, resulting in river flow entering the wetlands via the diversion channel. The consequential floodwaters and impoundment behind Prado Dam deposited debris and sediment in the diversion channel and ponds. OCWD removed deposited sediment, using this material to reconstruct damaged roads and levees, and rebuilt the wetlands to their original configuration.



Groundwater Management

As water is withdrawn from Orange County's groundwater basin, OCWD uses Santa Ana River water as a primary source of groundwater replenishment. Water from the river is comprised of stormwater, highly-treated wastewater from upstream of Prado Dam and other natural sources.

Stormwater Capture

Prado Dam is the primary flood control facility along the Santa Ana River. When the dam was completed in 1941, the Corps, which owns and manages it, considered conservation an incidental function of the dam. Initially, the water conservation level behind the dam was limited to a small amount, which increased through time.

In 1993, an agreement with OCWD, the Corps and USFWS allowed for increased water conservation from March through September each year to store up to 26,000 acre-feet of water at elevation 505 feet. In 2006, an agreement was reached between OCWD and the Corps to store more water from October through February each year by increasing the conservation pool from elevation 494 feet to 498 feet. The additional water captured behind the dam is used to recharge the groundwater basin. The added storage capacity allows OCWD to increase its use of local water resources, saving water users millions of dollars in imported water purchases. The District is currently working with the Corps to complete a feasibility study to increase the water conservation elevation to 505 feet year-round.



Endangered Species & Habitat Conservation

Prado Basin is home to several rare and endangered birds and waterfowl species. As part of a conservation agreement with the Army Corps of Engineers (the Corps) and the U.S. Fish and Wildlife Service (USFWS), OCWD has restored hundreds of acres of habitat for the endangered least Bell's vireo and Southwestern Willow Flycatcher, and has funded more than \$3 million in mitigation and monitoring measures for the vireo program.

OCWD's vireo program has been one of California's great environmental success stories. The program includes restoration of vireo habitat and the trapping of non-native cowbirds that invade the vireo nests. When the three agencies first began discussions in 1986, there were only 19 pairs of vireo song birds in the Prado Basin. Today, the number of male territories is more than 1,500 throughout the watershed and continues to grow as more fledglings are produced and reach maturity.

OCWD contributed \$1 million to help create the Santa Ana Watershed Association (SAWA) to lead the removal of a non-native plant, *Arundo donax*, that had overrun the watershed. *Arundo* is a major threat to the wildlife of the entire Santa Ana River watershed. Its removal effectively restores and enhances the environment. Since its inception, SAWA has raised more than \$35 million and has removed 5,000 acres of *Arundo*.

