Researchers study effect of yuma desalting plant on Cienega de Santa Clara

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Bernabe Rico Hurtado downloads data from instruments placed in Cienega de Santa Clara to record water quality and water level. The cienega, located in Mexico, is the largest wetland on the Colorado River Delta. Credit: Karl W. Flessa

A binational team is studying whether running the Yuma Desalting Plant will affect Mexico's Cienega de Santa Clara, the largest wetland on the Colorado River Delta.

The cienega, a 15,000-acre wetland, is home to several endangered species and is a major stopover for birds migrating north and south along the Pacific Flyway.

The desalting plant, or YDP, is scheduled to begin its latest trial run May

3.

"The plant will use U.S. agricultural runoff that would otherwise flow to this Mexican wetland," said team leader Karl W. Flessa, director of the UA's School of Earth and Environmental Sciences.

About 30 percent of the water now flowing into the cienega will be diverted into the plant for desalination. The plant's effluent, a smaller volume of much saltier water, will be returned to the canal that flows into the cienega.

The Mexican community of Ejido Johnson operates a small ecotourism business at the wetland. Birdwatchers are attracted by the birds found there, including the Yuma Clapper Rail, listed as an endangered species by the U.S. and Mexico.

"We've been monitoring the water level, water quality, bird populations and vegetation in the cienega to find out if the operation of the Yuma Desalting Plant will affect the ecosystem," said Flessa, who is also head of UA's geosciences department.

The team, scientists from both Mexico and the U.S., has been collecting baseline data since 2006 and plans to continue during and after the desalting plant's trial run. The plant is scheduled to operate for a total of 12 months out of the next 18.

"It's really unusual to have this level of cross-border collaboration on such a sensitive water issue," said Flessa. "We've expanded our efforts since September, thanks to support from the three major western water agencies and INE, the Mexican National Institute of Ecology."

The agencies are the Central Arizona Water Conservation District, the Southern Nevada Water Authority and Metropolitan Water District of

Southern California.

The cienega currently receives about 107,000 acre-feet of agricultural runoff water per year. When the YDP is running, the cienega is projected to receive about 67,000 acre-feet of runoff plus about 10,000 acre-feet of effluent from the plant.

An acre-foot of water is 325,851 gallons - enough to support a family of four for one year, according to the Central Arizona Project.

"I think we've got a good idea of what the natural range of variability is," he said. "So the question now is: When one-third of the water gets taken out to go through the Yuma Desalting Plant and a salty brine starts flowing toward the cienega instead, how will that affect the health of the cienega?"

Mexico's Cienega de Santa Clara, the largest wetland on the Colorado River Delta, is home to many species of birds, including egrets and coots. Credit: Francisco Zamora

To answer that question, the researchers placed instruments that record

water quality and water level every 30 minutes at 20 locations all over the cienega. Some instruments are in open water, some are along the edges of the marsh, and others are deep in cattail thickets.

Every month, the researchers use small boats to visit every instrument and download the information stored in it.

The team also measures water flow where the cienega's main sources of water, the agricultural canals known as the Bypass Drain and the Riito Drain, empty in the cienega.

The researchers assess the bird populations during the breeding season and during the spring and fall migrations. The team uses satellite images to measure the extent of the vegetation.

"We see the cattails green up in the spring and die back in the fall," Flessa said. "We're not sure if the seasonal variation in water level is because of agricultural water use north of the cienega or because of seasonal changes in water use by the cattails."

At the April meeting of the monitoring team, the researchers were able to see whether the April 4 Mexicali earthquake affected the cienega.

"We may yet see some evidence of earthquake effects in the data, but while in the field on April 21 we did not see significant changes in the water level," he said.

The water monitoring equipment is still functioning, and the Bypass Drain is still delivering water to the cienega, he said.

In the future, the researchers will download some of the water data remotely thanks to an instrumentation grant from the UA Water Sustainability Program.

"We will be able to sit at our computers in Tucson or Mexicali or in Phoenix and see how the water level and water quality is changing in real-time," Flessa said.

Provided by University of Arizona