Natural reserve sites host researchers and volunteers studying ecological challenges

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Researchers collect data about plant growth for a study near the Steele/Burnand Anza-Borrego Desert Research Center, a site managed by UCI that is part of the University of California Natural Reserve System. Credit: Sicco Rood / UCI

Amid the extreme aridity of the vast Colorado Desert of eastern San Diego County, a ribbon of greenery allows life to thrive.

The Sentenac Cienega area inside Anza-Borrego Desert State Park is

more than 100 miles southeast of Irvine. It contains a desert wetland, which is part of the San Felipe Creek watershed that is fed by nearby mountains and ultimately flows into the Salton Sea.

But the wetland is sick from invasive, non-native plants, and its water levels are dangerously low. Researchers from UCI are trying to figure out why.

In decades past, cattle ranchers had burned the native vegetation to increase forage for cattle, and invasive tamarisk trees had moved in. When the state park acquired the land in the late 1990s, these shrub-like trees were removed in the hopes of restoring the native ecosystem.

Yet contrary to the success of other tamarisk removal projects, it didn't work for Sentenac Cienega. The season during which surface water saturates the soil has continued to shorten, invasive grasses and shrubs have encroached on new territory, and native vegetation has failed to take root. Even some of the existing native cottonwoods and mesquite trees have perished.

Nestled near west the entrance to the state park is the Steele/Burnand Anza-Borrego Desert Research Center. From this base UCI researchers are seeking to restore the wetland ecosystem. They're applying science to thorny land management problems and teaching the next generation of land managers to do the same.

"Land management is most effective when decisions are informed by science,," says Megan Lulow, executive director of UCI Nature, which oversees UCI's field-based sites, including the Anza-Borrego center. "State Parks has assembled a team that has enabled UCI researchers and students to provide that scientific knowledge."

A network of natural reserves

The Anza-Borrego center is one of three sites that UCI manages. They are part of the University of California's Natural Reserve System. A hundred miles north of Anza-Borrego at the western edge of the Mojave Desert is a second site, the Burns Piñon Ridge Reserve. And in Irvine, directly across the University Drive from UCI, is the third, the San Joaquin Marsh Reserve.

At these sites, UCI faculty and students gain firsthand experience working on ecosystem restoration projects. They conduct research that will inform land managers who seek ways to ensure that wildlife and their habitats are able to weather climate change.

Wildflowers bloom on a ridge at Coyote Canyon near the Steele/Burnand Anza-Borrego Desert Research Center, a site managed by UCI that is part of the University of California Natural Reserve System. Credit: Sicco Rood / UCI

Researchers from across California and around the world travel to the sites. In the case of the Anza-Borrego center—which is a renovated Googie-style motel from the 1950s—they also gain a respite from the urban sprawl so they can concentrate on their work and, at the end of long days, gaze at the star-washed night sky.

At the San Joaquin Marsh Reserve, Orange County students in grades K through 12 participate in class field trips. Through the UCI Center for Environmental Biology, UCI undergraduate students carry out year long internships at this reserve and others in Orange County, including the UCI Ecological Preserve, which is part of a habitat conservation plan called the Nature Reserve of Orange County.

In addition to undergraduate interns, students in the Masters in Conservation and Restoration Science program conduct much of their field based training at the UCI managed natural reserves.

Students from this program work on the restoration plan and affiliated research at the Sentenac Cienega site, assessing the soil, hydrology and vegetation, as part of the five-year research plan. Experimental plots receive different treatments, such as weed removal, while different plants that hold promise for restoration efforts are compared.

"The site itself is so gorgeous. To be immersed in such an incredible space—and for the students to experience that when it's really hot or really cold or when they have to push through this fivehook bassia, an invasive shrub that really hooks its claws into you—that really sticks in your memory," says Sarah Kimball, a plant ecologist and associate adjunct professor in ecology & evolutionary biology at UCI. "It's nice to have them working on something real rather than just reading about projects."

Graduates from the masters program, which is only teaching its third

cohort, have gone across the country to work for consulting companies, native plant nurseries or large-scale conservation projects. Others end up managing reserve systems on their own.

A haven for volunteers

At the natural reserve sites, community volunteers also participate in scientific activities, such as monitoring wildlife and capturing the data that helps land managers make science-informed decisions.

Each year at the Anza-Borrego center, volunteers gather to tally a herd of bighorn sheep, which are an endangered species. The volunteers, some of whom have returned for 40 years, spend two-and-a-half days over the July 4 weekend at various isolated locations near creeks, springs and other watering holes, counting every sheep that comes for a drink.

"It's pretty rough because the temperatures are going to be anywhere from the low 100s if you're lucky, but more often than not, it's around 110 or 120," says Jim Dice, the reserve manager. "It's a very specialized group of volunteers."

A coyote gazes toward the sun near the Steele/Burnand Anza-Borrego Desert Research Center, a site managed by UCI that is part of the University of California Natural Reserve System. Credit: Sicco Rood / UCI

At the San Joaquin Marsh Reserve, Sea & Sage Audubon Society volunteers spend three to four hours every month conducting bird counts. The marsh lies under the Pacific Flyway, which is traversed by least a billion birds each year from the Arctic to Patagonia. It functions as a crucial stop for birds migrating north and south along the Pacific Coast.

The Anza-Borrego center provide researchers a place to affordably stay

while doing multi-day field expeditions in the adjacent 615,000-acre state park. During the summer, few researchers brave the heat. But during the other seasons, researchers from around the world fill the four independent room units and 24 beds in the dormitory wing. Students from across the country arrive for in-field courses.

The arid desert landscape is home to a surprising array of wildlife. Mountain lions, coyotes, kit foxes. Bighorn sheep, kangaroo rats, mule deer. Hawks and owls.

Aside from being a first-rate nature photographer, Sicco Rood, a UCI research associate and technician at the site, helps researchers with their projects, taking measurements and maintaining equipment. The tableau of nature unfolds for him on daily hikes during which he reguarly takes photos for the center's social media sites.

A symbiotic relationship with the desert

What happens in this natural world affects even urban dwellers along the coast. If the Colorado River dries up, so do faucets in Orange County. If toxic dust blows off the Salton Sea, it harms the lungs of people across Southern California. And climate change, the gravest threat of all, is affecting all forms of life, from desert bighorn sheep and desert wetlands to city-dwelling humans.

"These natural spaces show us that there's such a bigger world around us than the freeway and the urban jungles of concrete. There's all these animals and plants that have these interesting lives," Rood says. "It takes a village of bighorn to raise a bighorn sheep. When people see that, they realize there's so much more out there than they're used to seeing."

Climate change can be difficult to rally people around, because the effects are long term and seem abstract.

"The more researchers that we can get out here to examine how the ecosystem is changing the better, because then it becomes concrete," Rood says. "These researchers are in some ways studying the canaries in the coal mine. If there are species die-offs, it's going to affect everyone."

Provided by University of California, Irvine

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