

Division Programs Update

Habitat Management and Restoration

This summer brought several new additions to APE: in June we welcomed postdoctoral fellow Erin Conlisk, who will be developing a spatially explicit restoration plan to aid the San Pasqual Valley's coastal cactus wren population, while August brought postdoctoral fellows Kelly Andersen and Burak Pekin, who will be tackling two long-term projects in Eastern Oregon. APE also welcomed three Research Associates on loan from other departments at the San Diego Zoo's Safari Park: Savanna Smith and Josie Fox (Park Education) and Demi Dambrino (Park Security). They are aiding with the flurry of fall field work with restoration projects.

Sustainable Use of Plant Resources

Photo by Deborah Small



APE's *Native Roots: The Nature of Art* program recently received a grant from the Escondido Charitable Foundation to bring a dynamic curriculum focused on historical and contemporary Native American culture to 3rd and 4th graders throughout the city. Through our partners at Cal State San Marcos, Native Talk, and various American Indian artists, basketweaving and storytelling will highlight traditional use of natural resources and bring the vibrant cultures of Native Californians to life while meeting several social studies, sciences, and language arts standards.

Seed Banking and Conservation

As the SOS program winds down for awhile, the Native Plants Seed Bank has focused on all the aspects of maintaining a seed bank that tend to be overshadowed by the fervor of collecting: seed processing, database maintenance, germination studies, and more. We will also be focusing on species specific projects (see Species Highlight).



Applied Plant Ecology Newsletter

Trio of Summer Fellows Make Their Mark

UC Santa Cruz undergrad, Ryan J. Hegstad, learned the joy of studying cacti during his Zable Foundation Summer Fellowship with the Applied Plant Ecology Division (APE). Ryan participated in many different activities ranging from watering restoration plots in Temecula and the Safari Park Biodiversity Reserve to doing statistical analyses. His main focus was on studying the phenology of the coastal sage scrub (CSS) plant community with an emphasis on the coastal prickly pear (*Opuntia littoralis*), a key species in the Safari Park's Biodiversity Reserve.

He created a precise protocol for monitoring coastal prickly pear phenological events and statistical methods for analyzing data previously collected by Stacy Andersen on thirteen CSS plants. Ryan found trends in the production of new leaves and flowers with precipitation and temperature in many plant species. Though he conducted an initial analysis, the studies will be continued for many years to come, and stronger trends and more information will likely be found.

Keeping with his focus on coastal prickly pear, Ryan also found that the spiny plant provides an incredible amount of spiny fruit for the CSS community, the biomass of fruit for each acre of cactus reaches over 68kg in dry mass per year; in the Safari Park's Biodiversity Reserve this converts to over 12,000kg of dry fruit a year available, clearly signifying it as a key species in the community. Ryan hopes to continue working in the field with plants and phenology following his graduation from UC Santa Cruz in the Spring of 2013.



Most animals don't like to get up close and personal with cactus, but there is one charismatic bird who calls these thorny plants home. The coastal cactus wren are unique passerines that build conspicuous, year-round nests in cholla or prickly pear cacti. These birds are considered a species of special concern in California due to their close association with the patchy and dwindling form of coastal sage scrub dominated by cactus.

Recently earning her Masters degree from UC San Diego, Angelita Ashbacher utilized her knowledge of California vegetation while working as a Foundation for Sustainability and Innovation Fellow for APE. Her research aimed to characterize the habitat surrounding coastal cactus wren nest sites. By comparing sites containing wren nests to sites without nests, Angelita hoped to better understand what these birds like and what they try to avoid.



After surveying 28 sites across San Pasqual Valley, she found that coastal cactus wren prefer to build nests in cacti nearly two meters tall which are surrounded by a "fortress" of shorter cactus. In addition, the wrens like to build where shrubs are short, likely so that predators such as snakes can't use them to gain access to their nests. She also found that wrens favor open ground relatively free of grass cover.

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Species Highlight

Acanthomintha ilicifolia
San Diego Thornmint



Every once in awhile the shrubby vegetation of coastal sage scrub or chaparral habitats in San Diego County give way to open areas with heavy clay soils and sparse vegetation. It is on these pockets of crumbly clay that the rare and endemic San Diego thornmint can be found. The petite herb (growing only 2 to 6 inches in height) produces beautiful clusters of flowers above oval-shaped bracts edged with long spines. Though the two-lipped flowers are predominately white, the lower has a light brush of color ranging from rose to purple. This delicate annual is one of the few native plant species that grows on the clay lenses derived from gabbro and calcareous sandstone substrates, which are simply unsuitable for most of the common sage brush, chaparral, and grassland species surrounding the lenses. It is the loss of this unlikely habitat type to which it is suited that threatens this species.

As organizations attempt to help boost the population of San Diego thornmint, they have discovered that much is not known about the ecology of this plant, other than its requirement of clay lenses on gentle slopes. The Center for Natural Lands Management would like to know if the scattered populations of thornmint are genetically specialized to their particular corner of the county – this determines whether its appropriate to use seed from once site to help repopulate another. To help determine this, APE will be conducting a common garden experiment with seed collected from populations throughout the county. Any physiological differences between populations will be reported back to the Center to help inform their restoration plans to help conserve this federally threatened San Diego treasure.

Such areas may provide important foraging space for birds to hunt insects and lizards, and it may allow the birds to spot oncoming predators. Angelita's research will be expanded to sites across San Diego County in order to develop comprehensive restoration strategies for these charming wrens.

For UCSD graduate Rosa Chung, working with the Institute for Conservation Research has been an ongoing aspiration since her first tour of the Beckman Center two years ago. This past summer, her hope became a reality when she joined the APE team as a Helm Summer Fellow. Among eventful days of vegetation surveys, cactus wren habitat assessments, and the occasional cacti watering, Rosa was able to create a population model of the coastal cactus wren with her mentor, Postdoctoral Fellow Erin Conlisk.

Through a generous grant provided by SANDAG, the APE division plans on restoring 50 acres of coastal sage and cactus scrub habitat in San Pasqual Valley to encourage growth in the dwindling population of cactus wrens. Rosa's population model tackled the question of where and how restoration should occur in order to maximize wren population success. Rosa explored the relative benefits of potential habitat strategies such as enlarging patches, creating corridors to connect patches, and restoring habitat surrounded by houses to buffer the impacts of fire.

Results from the model suggest that an urban refuge strategy may prove the most beneficial for the cactus wren population during times of devastating fires. Though an important first step, conservation efforts will not end with these computer models, but will move forward with collaboration between the APE researchers and land managers through San Pasqual Valley to discuss the practicality and the potential effectiveness of each habitat strategy. We will see the fruits of Rosa's model in 2013 when restoration planting begins!



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The Applied Plant Ecology Division researches the restoration and management of plant populations and communities. Focusing on more than threatened and endangered species, the division concentrates on keystone species, interactions, and processes for the benefit of not only plants, but the animals and people that depend on them. Our projects link research and application with a focus on solutions.

UPCOMING

- October 29- November 1
SOS Partners Meeting.

Sara Motheral will be travelling to Chapel Hill, North Carolina to represent APE at the annual meeting for partners in the SOS program.

- November 22-26
Miren Annual Meeting.

Postdoctoral Fellow Kelly Andersen will be presenting findings from a long-term project in Oregon to the Mountain Invasive Research Network at the meeting in Pucón, Chile.

- December 2012 San Pasqual Valley
CACW Restoration Meeting.

The many land managing organizations within the San Pasqual Valley will come together to discuss the effort led by Erin Conlisk, Postdoctoral Fellow, to find the most effective locations to restore cactus wren habitat.