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News and Highlights at COPR

by Dr. Cristina Sandoval

Education Center



Drawing of future education center by Lauren Dykman

The vision of the new Education Center for Coal Oil Point Reserve is now a reality. The Center will support environmental education and research for all ages through classes, tours, volunteerism, and

science. We've made huge progress in the fundraising for the renovation of new Education Center. The renovation will cost over a million dollars and we are only \$150,000 short. Thank you all who have contributed to this exciting project. We hope to achieve our final fundraising goal by February 2015 and start the renovation by the summer of 2015. Please consider supporting this exciting project.

Coal Oil Point Reserve Documentary

Michael Love, writer, producer, and director is creating a documentary about the Coal Oil Point Reserve's natural history and the changes in the environment through time. The film will be an education tool for the new Education Center and will first screen at the 2015 Santa Barbara Film Festival. With Michael's patience and dedication, the film will show rarely seen wildlife and the amazing 2014 February storm that drastically altered the mouth of Devereux Slough and the beach profile.

Tank Fire

On June 26, 2014 a brush fire at Coal Oil Point Reserve (COPR) burned 19.7 acres. The fire started on the west end of the Reserve and quickly traveled east, as a result of strong dry winds. The police have not determined the cause of the fire. Firefighters were on site minutes after the call and were able to prevent damage to research equipment. The fire did not affect any major structure on the Reserve but burned newly restored areas, exotic trees, and natural areas. This fire was a blessing in



some respects. The reserve had not burned for several decades and the vegetation had accumulated dead brush. The fire cleaned up much of the fuel and regenerated the vegetation. We were impressed at how fast the natural vegetation grew back, even in a record dry year and before the rain had started. The fire has also created new opportunities for research on fire ecology and allowed us to better understand the landscape.

The Big Storm

On March 1st, large storm waves coincided with an extreme high tide and caused massive erosion at Sands Beach. A 15 ft high cliff was formed that divided the beach and the dunes. The surge was so strong that the next day, kelp was found on top of the bluff 30 ft. above the beach.



June 30 2014



August 4 2014



Erosion of the dunes from the March storm. Note the height of the person and the eroded dunes

The old sea wall on Ellwood beach broke apart and the boards piled up at the mouth of Devereux Slough. We removed 150 boards to avoid the impacts of leaching of toxic pollutants found in these boards. These types of unusual but large events sometimes shape the landscape for years to come. I watched from my deck at home as a series of gigantic waves rolled over the slough mouth and into the dunes. When they retreated, about 1 acre of vegetated scrub floated away into the ocean as if someone had cut out a piece of the landscape.



2014 Snowy Plover Breeding Season

by April Price

The 2014 Snowy Plover Breeding Season at COPR was full of highs and lows. There was a high level of nest predation but the lowest chick predation that we have seen in years. At the end of the season, we had 26 fledged Western Snowy Plovers. To put things in perspective, the average from 2002-2013 was 29, with a low of 9 and a high of 61 fledged chicks.

We try to identify the causes of breeding failure to better manage the population. Of the 54 nests laid between March and May, only 7 (13%) of them hatched. Many of the nests were eaten by skunks and raccoons. Another cause of nest failure was abandonment; of the 14 nests laid in March, half were abandoned. Usually, plovers do not abandon their nests once they begin incubation. Although we aren't certain of the cause of nest abandonment at COPR, we suspect that adult mortality was to blame. The data at other plover nesting sites suggests that nests are only abandoned when one of the parents is killed by a predator, and therefore unable to assist in the incubation of the eggs.

In the second half of the plover nesting season, the plovers did better. Of the 24 nests laid in June and July, 13 hatched (54%). Plover chicks are considered "fledged" after they are a month old. In recent years, we have had relatively low fledge rates as a result of chick predation; the average fledge

rate between 2010 and 2013 was 31%. The fledge rate doubled in 2014 (66%).

We would like to thank the Snowy Plover Docents for all of their hard work throughout the year. The plovers face a host of natural threats on the beach. By giving them space to feed and nest peacefully, we reduce the challenges that they must face on a daily basis.



Western Snowy Plover-Photo by Callie Bowditch

Education Program at COPR

by April Price

In the spring of 2014, 160 3rd-5th grade students from Cleveland Elementary School, Santa Ynez Charter, St Raphael, and Mountain View Elementary Schools attended programs led by COPR's education program. UCSB interns taught about endangered species, plant and animal adaptations, and the Devereux Watershed through hands on lessons and nature-appreciation activities. It was a pleasure to watch the elementary students thrive outdoors, and to see the mentorship skills of the UCSB interns grow over the quarter.



"This is a really great field trip...When I'm at home my mom never lets me go outside. It's too dangerous... My sneakers are dirty, but this is good dirt!" -5th grade student

"I gained the skills of establishing a respectful atmosphere with children, keeping them enthused, and familiarizing them with nature." -COPR education intern from UCSB

We also taught teens from the Police Academy League (PAL) in a pilot program supported by our friend Aaron Budgor. Teens explored various habitats at the Reserve, took water quality measurements, assisted with habitat restoration, and engaged in nature journaling and photography. We look forward to working with the PAL teens again in 2015.

My Experience at COPR

By Hillary Niel

Coal Oil Point Reserve offers internships, volunteer opportunities, a place for research, and a place for relaxation, all of which I had the privilege of enjoying during my time at UCSB. One of my favorite (of many) programs that I became involved in at COPR was the Education and Outreach Program. Within this program, I learned about effective communication methods, how to frame environmental education lessons, and the best ways to present environmental issues, all while enjoying what the reserve has to offer. We used these communication tools to lead tours to 4th-6th grade classes and got to have a large impact on how these

kids viewed the reserve and their natural environment as a whole.



Hillary graduated from UCSB in the spring of 2014 with a BA in environmental studies and a minor in English

The most rewarding part of this experience was knowing that this work was making a difference on a local scale—some of the students we were able to teach couldn't even remember the last time they had been to the beach, and most of them lived within a few miles of it. I was able to participate in this program two years in a row, and saw some of the students from my first year return for a second. They remembered the story of the Snowy Plover, the relationship between predators and prey, the importance of clean rivers and streams, and made large-scale connections between these ideas. Then they were able to build upon this information and learn new, exciting things that they might share with a parent, sibling, or even a grandparent. A few students even went as far as to say this was their favorite trip of the year, which was incredibly



rewarding to me. I would say that getting involved with Coal Oil Point's many internship programs, and in particular the Education and Outreach Program, was one of the best decisions of my collegiate career. Relearning environmental ideas through the eyes of a child helped center me on what was really important—excitement, wonderment, and responsible stewardship.

Habitat Restoration Yearly Update

by Tara Longwell

In 2014, COPR offered habitat restoration internships to 30 UCSB students, and worked with volunteer groups including Circle K, UCSB Bren Sustainability Committee, Chi Delta Theta, Freedom 4 Youth, and staff from the Santa Barbara Zoo.

While the record breaking drought and wildfire brought on a new set of challenges for planting and maintaining our restoration sites, we were still able to plant over 3,000 native plants. Although some of our restoration sites were affected by the Tank Fire, the burn created a great opportunity to observe post-fire succession. As an added benefit, the Tank Fire provided an opportunity for our restoration interns to work with researchers and assist in collecting data on post-fire recovery.

This winter will be the final planting season of a four year grant funded by the California Coastal Conservancy. We will continue to plant and maintain native species along the Pond Trail in our

effort to create a biological buffer to reduce the ecological impacts of the trail.

Coastal Live Oak Plantings

Coal Oil Point Reserve collaborated with the local non-profit Goleta Valley Beautiful to plant 150 Coastal Live Oak trees on the northwest corner of the reserve. The project is part of a long term goal to create a wildlife corridor connecting protected habitats and freshwater resources within the Devereux watershed. The vegetated corridor will reduce the effect of habitat fragmentation and facilitate movement of wildlife across the adjacent open space areas.



Oak Tree Plantings

The trees were about 5 years old at the time of planting and range from 3 to 6 ft tall. The oaks were grown by Goleta Valley Beautiful from acorns collected in the Devereux and San Jose Creek watersheds. In the Spring of 2014 over 100 volunteers from the community assisted in the plantings of the oak trees.

To get involved with the restoration program at Coal Oil Point please contact Tara Longwell at longwell@lifesci.ucsb.edu

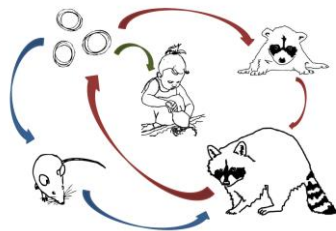


Current Research at COPR

Raccoon Roundworm: Not just a raccoon parasite, by Sara Weinstein, EEMB graduate student

Raccoons host a variety of parasites and one parasite of particular concern is the raccoon roundworm. This large nematode can cause severe disease in humans and other wildlife. Raccoon roundworm is linked to rodent declines and has the potential to significantly impact ecosystems, yet relatively little is known about its ecology. We are studying this parasite in the mammal community at Coal Oil Point Reserve, focusing on the adult worm population in raccoons, juvenile worms in rodents, and infectious eggs in the environment.

The raccoon roundworm infects 80% of raccoons at the reserve. Worm loads are higher in younger individuals and heavily infected animals release more parasite eggs in their feces. Raccoons use communal defecation sites called “latrines”. Other animals, such as rodents, are exposed to infectious parasite eggs when they forage in raccoon feces.



We are mapping the distribution and density of raccoon latrines at the reserve. By using motion activated wildlife cameras placed at the latrines, we hope to understand how other animals interact with these contaminated sites and determine their risk of exposure.

Mice are frequent visitors of latrines and we have found larval parasites in three of the most abundant rodents in the reserve: the harvest mouse, deer mouse, and black rat. The black rat, an invasive species, are heavily infected and some individuals carry over 500 larval worms. The native harvest mice are rarely infected while 45% of the deer mice are infected and in over 50% of these mice, larvae have migrated to the brain. A parasite in the brain can impair the daily routine of the host, making it an easy target for hunting raccoons and increasing the potential to amplify disease transmission.

Humans are also susceptible to raccoon roundworm infection. Although diagnosed cases are rare, Southern California has a large, heavily infected raccoon population and our exposure risk is high.

Human infection rate is currently unknown, but we have just launched the first ever population survey for human raccoon roundworm infection and are now recruiting volunteers from Santa Barbara County. If you would like to be tested for raccoon roundworm please contact us at SBparasitology@gmail.com.



Measuring our Environment, Geography 175

by Prof. Dar Roberts

The potential that a student will learn and retain important scientific concepts can be greatly enhanced when they are given the opportunity to formulate their own research questions, design their own experiments and test them in environments that they can personally experience – not a textbook problem set, nor a virtual lab. This is the central idea behind *Measuring our Environment* (Geography 175), in which students use micrometeorological data (e.g. rainfall, air temperature, humidity) collected within the Coal Oil Point and Sedgwick Ranch Reserves since 2007, to formulate research questions, test their ideas with real observations, then relate how environmental change impacts plant response by comparing instrumental observations to field data. Field data are collected by the class working as a team then shared in group projects which are presented at the end of the quarter. In addition to standard field measures, such as plant species cover along transects, students collect unique data such as color digital imagery and surface temperature, which the class analyzes in the lab and shares. Another key concept is learning by contrasts – comparing coastal (Coal Oil Point Reserve) and interior (Sedgwick Reserve) sites or comparing different seasons and

different years. All field observations, which are typically collected in the spring during several field trips, and have been collected in 2008, 2011 and 2013, are made accessible to current classes. Thus the students of 2015 can draw upon historical data collected by past classes to answer new questions, further enhanced by more than seven years of instrumental observations. 2015 promises to be particularly exciting as we enter the fourth year of the worst drought in California in over a century and students can directly determine how the drought has impacted the kinds of plants they find, their abundance and the timing of key events such as germination, flowering, fruiting and senescence. The small fire that burned half of the field plots in 2014 at Coal Oil Point adds another interesting opportunity for student research, while the impact of long term restoration efforts can be further studied.



Geography 175 Class Visit

Upcoming Events

- **End of Year Party:** December 5th at 6:00 PM, at Cris' home at the reserve. Details to be announced
- **Habitat Restoration Workday:** December 6th, Jan 31, Feb 21st, and March 7th 9am-12noon. RSVP: longwell@lifesci.ucsb.edu
- **Snowy Plover Docent Training:** Saturday, January 24th 9am-12pm. RSVP: copr.conservation@lifesci.ucsb.edu
- **Tours of Coal Oil Point Reserve:** First Saturday of each month from 10am-12pm. RSVP: copr.conservation@lifesci.ucsb.edu



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