

UC Santa Barbara

Newsletters

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COAL OIL POINT RESERVE

2021 Year in Review

**Featuring
COPR Staff
Updates...**

**Plus
Student Stories
at COPR...**

**The Latest
Research
on Plovers...**

A Message from the Reserve Director

by Dr. Cristina Sandoval

Dear friends of Coal Oil Point Reserve,

This year, we are celebrating 20 years of the Snowy Plover Program at UC Santa Barbara's Coal Oil Point Reserve (COPR)! To learn more about all that we have accomplished over the past 20 years, check out [this article](#) in the UCSB Current.

There is so much that we have accomplished. Since 2001, the Snowy Plovers returned to COPR for nesting after decades of having abandoned Sands Beach. In the last 20 years, our goal was to create a protected habitat for plovers to nest safely at COPR. In doing so, we have trained students and community members to be ambassadors for the plover program at Sands Beach. By providing student stipends through UCSB Coastal Fund, students are able to obtain financial support while learning valuable skills.

Our metrics below show the huge impact of protecting Snowy Plovers at COPR since 2001.

- *1,263 Nests Laid*
- *1,396 Chicks Hatched*
- *647 Chicks Fledged*
- *>500 Docents*
- *49,500 Docent Hours Volunteered*
- *230 Student Stipends Offered*

I am also happy to re-open the reserve for activities such as visits to the Nature Center, guided tours, and restoration workdays. So much of our enthusiasm comes from seeing our visitors learning and enjoying the reserve.

This Fall we had our second NRS Seminar Series which featured a different UCSB Reserve each week. If you missed it, you can still enjoy learning about exciting research and reserve facts at the [UCSB NRS YouTube channel](#).

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This coming year, we have new goals that I would like to share with you as a reserve supporter:

Increase the Diversity of Our Student Interns: Students are the future stewards of nature. At Coal Oil Point Reserve, we believe that the diversity of our students contributes to creative and innovative solutions. Our immersive internship program already supports a wide range of over 60 students from UC Santa Barbara each year. With additional support, we can broaden the opportunity to support students from underrepresented backgrounds committed to making a difference in environmental science and explore expanding our internship program to include Santa Barbara City College students.

Increase Undergraduate Research Projects: One of the things that Coal Oil Point Reserve does best is train students to become scientists. Our close proximity to campus allows students to experience hands-on research while attending classes. Wouldn't it be amazing if we could offer an undergraduate research fellowship and encourage underrepresented students to apply? Undergraduate research experiences at the reserve provide a hands-on window into field science, allowing students to explore it as a future career opportunity.

I invite you to support us in achieving these goals by giving to Coal Oil Point Reserve today: giving.ucsb.edu/to/COPR

I hope that we will see you at COPR soon and wish you a happy holiday season!

Cheers, Cris



UCSB student Joelle monitoring the water quality of Devereux Slough.



Students Abigail and Elise on a beach training day with Jessica and Linda.

Funding for UCSB student internships and assistantships provided by:



Snowy Plover Update

by Jessica Nielsen

We have an exciting milestone to share: this year marked the 20th anniversary of the Snowy Plover Recovery Program at Coal Oil Point Reserve. Thank you to all who have contributed to making the reserve the first place to recover a previously abandoned plover nesting site and to continuing that success over the last two decades.

The 2021 nesting season had above average results of breeding population (56) and number of fledged chicks (42). A fledged chick is one that hatches and then survives to 28 days, the age at which they can fly and be completely independent from their parent. One of our recovery goals is to produce an average of 1.0 fledged chick per male and this year produced 1.5 fledged chicks for every male.

This is not to say the plovers didn't experience their fair share of drama! Plover predators still abound at the reserve. Through a combination of visual observations and predator tracks in the sand, we can say that Peregrine Falcons, Cooper's Hawks, owls, fox, skunks, crows and gulls all played a role pursuing plovers this year.

By adapting conservation methods throughout the season we were able to mitigate some of these impacts.

At the first indication of crows hunting on the beach in early April, we installed predator exclosures on all active nests. These exclosures protect the nests by encircling them with a mesh size that is big enough for a plover to fit through, but small enough that a crow cannot. They have an opaque plastic top with bird spikes and the structure is anchored to the ground using rebar to avoid having those very intelligent crows lift them up and also to secure the exclosures on windy days. We have now used this design of "plover condos" successfully since 2019 and this year we are happy to report that we did not lose a single nest to crows!

By July, skunks, another nest predator, began keying in on predator exclosures. Since the threat from crows seemed to be reduced, we made the decision to remove the exclosures from all nests. Unfortunately, the skunks continued to discover and predate the plover eggs so we moved on to another method. At the peak of the skunk predation period, we replaced all real plover eggs with wooden dummy eggs. Believe it or not, the plover parents were fooled and continued sitting on the fake nest. In the meantime, we incubated the real eggs in captivity until their hatch date when we placed them back in their nests to be raised by original parents. The hatching rate more than doubled after implementing the egg replacement method.

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Egg replacement in nest: 2 fake eggs (top), 1 real egg (bottom)



Female plover incubating fake wooden eggs in nest.

Staff Updates

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We continued our partnership with Santa Barbara Zoo who took on the huge role of raising all eggs and chicks rescued from the central coast. The eggs and chicks were rescued from situations in the wild that they would not have survived otherwise such as high winds and high tides. This year, twenty six eggs from various beaches hatched and fledged in the captive rearing program and were released at Coal Oil

Point Reserve. These plovers can be identified by the pink over yellow bands on their left legs. Their right legs are banded with different color combinations.

Thank you so much to our team of Snowy Plover docents and tour guides for spreading awareness and educating visitors about the plover program and the reserve. We look forward to another year of plover protection.

Stewardship Update

by Kipp Callahan

We are excited that, this winter, the interns returned to work at COPR for the first time since the pandemic started and we were able to plant over 900 plants as part of our restoration activities. A big thanks goes out to Angela Ma, the land steward assistant, and our interns Emalia Parlow, Iona McCabe, Rayna Ruggeri, Ronja Keeley, and Maya Chen.

In last year's newsletter, I talked about how we had introduced a few new species to the reserve that likely had been extirpated from past land use. This year we saw the literal fruits of that labor: the species that we planted over the last two years successfully produced fruit this year. These were golden yarrow (*Eriophyllum confertiflorum*), sawtooth golden bush (*Hazardia squarrosa*), deer weed (*Acmispon glaber*), and gooseberry (*Ribes speciosum*). Seeing a re-introduced species reproduce on their own in the field is an important step in having viable long-term populations at the reserve.

We also launched two projects to better understand and catalog the biodiversity at the reserve. We are now tracking and monitoring

mammals using camera traps in various habitats at the reserve. We are also collaborating with Dr. Katja Seltmann, the director of the Cheadle Center for Biodiversity and Ecological restoration, to create a clearing house for UCSB natural history data using the Symbiota platform. Symbiota is software specifically designed for storing and managing natural history data. We created species lists using data from museum specimens and observations from iNaturalist so that we would have species lists that are backed by verifiable observation data. You can check out the plant and arthropod checklists under the UCSB Natural Reserve Checklists tab at this link.

As we look forward to the new year, I am excited to soon have student volunteer groups returning to the reserve to help with restoration projects and to see what else shows up on our camera trap images.



Gooseberry (*Ribes speciosum*) in fruit. Photo credit: Rayna Ruggeri

Mammal Monitoring Program

by Kipp Callahan



The first ever documentation of spotted skunk on the reserve was this camera trap photo on August 4th, 2021.

The mammal monitoring program, launched this summer, is a project initiated by Dr. Sara Weinstein and Dr. Kevin Lafferty with the goal of collecting baseline data about rabbit populations on the reserve in face of the emerging threat of Rabbit Hemorrhagic Disease (RHD). This disease is deadly to rabbits and has been spreading through Southern California but has not yet reached Santa Barbara County, as far as we know. The goal of the project was to understand the impacts of RHD, but it soon became apparent that the camera trapping could have so much more potential.

In the first month of data collection, we were shocked to find photos of spotted skunks captured by our cameras. Spotted skunks had never previously been documented on the reserve so this was an extremely exciting find.

We were also able to confirm that we have gray fox active on the reserve as well! Gray fox has been historically known to frequent the reserve but we had not had a confirmed sighting in many years.

As a result of these discoveries, we realized that there was still much to learn about the wildlife at the reserve. We decided to setup a long-term mammal monitoring program with the goal of understanding more about the diversity of mammals at the reserve and how different species use different habitats. With the help of Dr. Lafferty and of interns Hanna Weyland and Max Roberts, we are selecting the sites that will become permanent locations for mammal monitoring across multiple habitats of the reserve.

We are excited to see what additional discoveries this project will yield.

Marine Sponges

by *Cristina Sandoval*

Professor Thomas Turner, a faculty at UCSB's department of Ecology Evolution and Marine Biology, enjoys spending time underwater, learning about the biodiversity of marine sponges. Like many researchers who spend time in nature, he realized that little is known about the creature he studies. His systematic and careful collecting, cataloging, and describing of the morphology and the genetic composition of his samples revealed five new species, with many more species still to be described as his work continues. His dives at Coal Oil Point resulted in the "documentation of about 40 species of sponges, but only about 15 have names so far".

Sponges are immobile aquatic invertebrates that filter feed bacteria and other nutrients. They are mostly found in the ocean but there are species can be also be found in estuaries or fresh water. Prof. Turner's work focuses on a very old group of sponges, the order Scopalinida. This order was only previously known from tropical waters and from the Falkland islands, with two species that have been recently discovered. Prof. Turner's surveys have shown that Scopalinida is also here, at reefs at COPR, Naples, Ellwood, etc.

The work of discovering a new species or a new location for an existing species is important in conservation because we can't protect effectively what we don't know. Now, more than ever when the environment is changing before our eyes, we need to understand the consequences of our anthropogenic dominance in the world. But why should we care? Could we live without sponges?



Prof. Thomas Turner conducting marine sponge research on SCUBA.

Here are just a few reasons why sponges are important:

- Scopalinida is an ancient group, a sister species of all other sponges. Old species groups give insight into the evolution of life on earth, a question that intrigues all of us: what are our origins?

- Scopalinida has chemical compounds that were unknown to us and were discovered to have anti-microbial and anti-tumor properties. Every time we lose a species through extinction, we also lose opportunities of potential benefits to humans. In economics, the loss of hidden opportunities is a financial loss.

- Scopalinida is a group that survived impressive global changes throughout its ancient existence. Through chance mutations and natural selection, it evolved and adapted and it is still here, hidden in the ocean we admire today. My favorite argument to protect species is not about what is their utility for me, it is philosophical. I believe that we don't have the right to extinguish another species, to end its amazing evolutionary journey, for small gains.

Prof. Turner's research reminds us that there is much to be discovered around us. To learn more about his studies, check out this [KCLU article](#) and his [lab page](#).

Snowy Plovers and Sea Level Rise

by Alexa Kerr



As we look to the future of the Coal Oil Point Reserve, climate change is inevitably on the horizon. Sea level rise in particular is anticipated to shift the fabric of our coastlines as we know them today. But what does this mean for the Western Snowy Plovers at COPR?

I began working with Coal Oil Point as a volunteer in the Snowy Plover docent program. As I watched these endearing little birds scurry back and forth from their homes in the protected area by the dunes to feed in the wet sand corridor, I began to wonder how the plovers, and therefore their nesting habitat, might shift in response to rising sea levels.

I explored this question through my senior thesis in Environmental Studies where I quantified the amount of snowy plover habitat which is expected to be below the shoreline in different sea level rise scenarios (Figure 1). First, I drew an area to represent the habitat which the plovers currently use for nesting based on historical data. Then, I used the CoSMoS model in ArcGIS to

project long term shifts in the shoreline in increments of 25 cm of sea level rise. Each shade of blue shows us the nesting habitat area which could be expected to be underwater at that level of sea level rise. project long term shifts in the shoreline in increments of 25 cm of sea level rise. Each shade of blue shows us the nesting habitat area which could be expected to be underwater at that level of sea level rise.

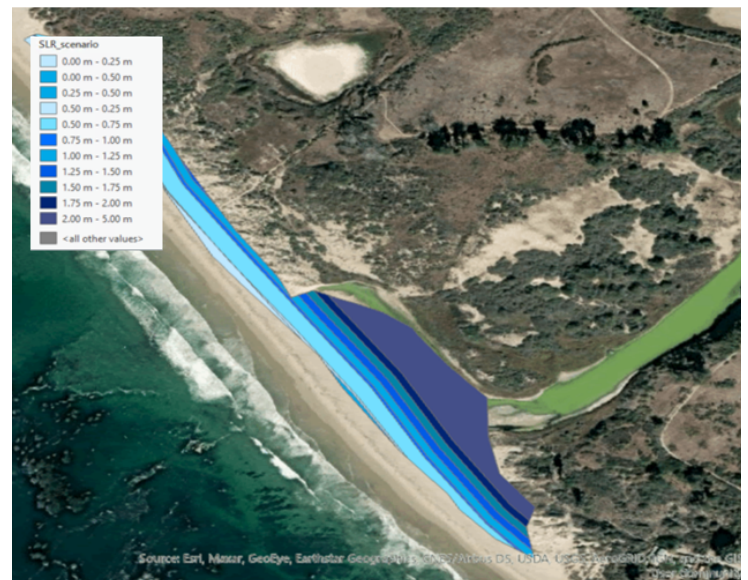


Figure 1. Map of static beach habitat polygon representing area (m^2) of habitat "lost" under different sea level rise scenarios.

The most significant loss is between 0.50m and 0.75m of sea level rise, where 37% or 14,300 m^2 of the total current nesting habitat would be lost. Some climate experts predict that this level of sea level rise could occur by the year 2080. Under 2.00m of sea level rise, 75% of the total current habitat area could be lost. Additionally, we have had a statistically significant increase in nests lost to tidal flooding based on historic nesting data from 2002-2020.

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However, this analysis doesn't indicate certain doom for Western Snowy Plovers at COPR. Beaches, coastal dune ecosystems and plover behavior are highly dynamic and adaptable, even seasonally between the winter and spring months (Figures 3 & 4). A dynamic habitat response would mean that sea level rise could potentially wash over and flatten more of the sand dune areas, like we see towards the back of the nesting habitat. I created a rough, preliminary sketch of what a dynamic habitat response could look like.

As seen in the graph below (Figure 2), a dynamic habitat response scenario would buffer the most intense changes from sea level rise. For example, the percent of total habitat area lost under 0.75m, the scenario with the most drastic amount of habitat loss, is lessened from 37% to 21%, with a similar amount of buffering along the range of 1 to 2 meters of sea level rise.

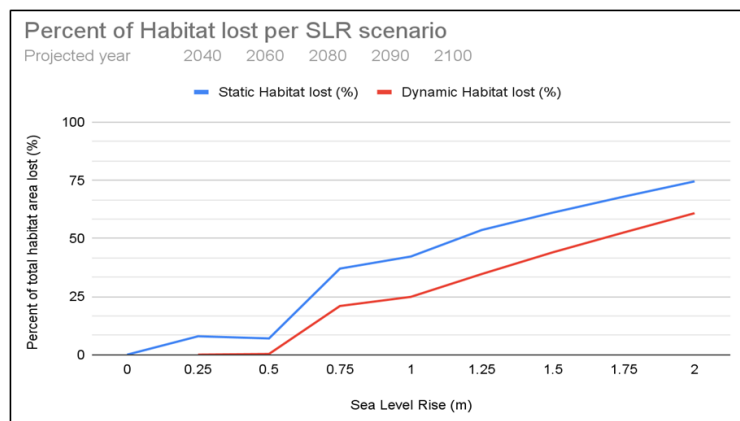


Figure 2. Percent of habitat lost per SLR scenario.

Overall, sea level rise will likely impact snowy plover nesting habitat, and may do so within our lifetimes. However, the more dynamic the habitat response, the more buffer there is for loss of nesting habitat on the ocean side as the shoreline increases. This research also indicates that for an effective conservation effort for snowy plovers to occur, we should explore climate-

oriented management strategies. The delicate balance of conservation and recreation which enables snowy plovers to thrive at COPR could not occur without the tireless dedication of staff, students, volunteers and community members. Their outstanding efforts to help protect snowy plover habitat through advocacy, education, and outreach are the key to maintaining this extraordinary space for humans and plovers alike.



Figure 3. Sands Beach inundated during a winter storm event.



Figure 4. Sands Beach during spring months.

Student Internship Experience

by *Hanna Weyland*



Western Snowy Plover with chick. Photo credit: John Stuelpnagel

I always found Western snowy plovers adorable. Their tiny fluffy bodies and quick-legged running style are just some of the characteristics that make them so charming. As an incoming master's student at the Bren School for Environmental Science & Management at UCSB, I could not have been happier to discover Coal Oil Point Reserve's Snowy Plover Program. I first began interning at the Reserve last fall working on reorganizing and recreating a database for the Reserve using a few large clearing house databases like the Global Biodiversity Information Facility (GBIF) and the California Consortium of Herbaria (CCH2). The newly reorganized data housed on the Reserve database will be used for future research projects at the university and promote similar methods for compiling and organizing natural history data within the UC Natural Reserve System. Throughout the fall, I collected data from different databases, growing my skillset to properly clean data, code in different languages, and use a suite of software systems. The knowledge I gained from data analysis classes helped me understand how to apply these skills to real-world applications.

In the spring of 2021, I started Western snowy plover monitoring on the Reserve. I was ecstatic about diving right into snowy plover breeding

season which is something I never experienced before. During the breeding season, some of my tasks included identifying locations of plover nests, determining which chick belonged to each clutch, rescuing abandoned eggs, and recognizing various threats to the plovers. Although it was difficult at times with so many plover adults and chicks running around, seeing the new chicks hatch every day was very rewarding, knowing that I played a small part in protecting their lives.

The Reserve is home to numerous species of wildlife, which is what makes this site so incredible to explore. By using wildlife camera traps on the Reserve, we are able to identify animals that reside here but are hard to see. For the past few months, coyotes, spotted skunks, and grey foxes are just a few of the animals documented on the cameras.

Now, as second-year master's student, I am beginning to understand the lay of the land at the Reserve. Early morning monitoring of the plovers has become part of my routine, counting individual plovers, and observing their unique color band combinations during wintering season. Waving hello to passing beachgoers and birders while educating the public about the snowy plovers makes me appreciate the sense of community that the Santa Barbara area offers. Throughout my experiences at the Reserve thus far, I gained incredible knowledge about snowy plovers and their importance to our ecosystem and community. It is exciting to work on projects such as these and I am eager to continue working at the Reserve to uphold our mission and protect the wildlife that calls Coal Oil Point Reserve their home.

Tracking Plovers

by *Thomas Sander*



I spend countless hours per week these days at Coal Oil Point Reserve (COPR) looking through my binoculars at small plastic color bands attached to Snowy Plover legs. Many Snowy Plover conservation programs up and down the west coast place these little bands on the legs of Snowy Plover chicks shortly after they are born in hopes that field biologists, devoted volunteers, and birders see them and report them to the appropriate authorities. These color band sightings provide information that travel up a chain to the Snowy Plover color band cloud that then distributes the information back to the biologists who are banding the birds. In the end, Snowy Plover conservation biologists can better understand migration patterns and breeding tendencies and this furthers their understanding of the greater ecology of these birds.

Color bands are unique to each bird, so they indicate year and location of birth. When we know age and birth location of an individual Snowy Plover, we can learn so much more about its life ecology. We can learn how far he or she travels from its natal ground and where it winters and where it breeds. The bands also allow us to give the plovers unique fun names. For example, Candy Cane is a favorite of ours. He has a very unique single plastic color band on his left leg

and it is tricolored, so it is white/red/white just like a candy cane. We see him every day without fail, rain or shine! Bubbles, received her name from the color combination of blue over blue on the left leg and lime over blue on right, thus it is bb:lb. She is also a regular at COPR. When we recognize individuals, we develop an attachment and cheer for their success in life.

Beginning in July is when I see the new birds, mostly from up north, begin to show up at COPR sporting fresh new color bands and these are chicks (now fledglings) that were hatched and color banded just a few months earlier. It's always a thrill to see them show up here at COPR knowing how far they have flown from their natal grounds, and I think how exciting it must have been for them to have taken their first long journey down the coast. Their arrival here at COPR also makes me wonder, why our beach at COPR? Is it the large quantity of other wintering Snowy Plovers that they like here or is it the ample supply of kelp flies and beach hoppers? Probably both, and I am sure that they sense the protection they receive at COPR.

It isn't anyone who would be filled with joy after a good day's effort at collecting Snowy Plover color band data, but I am one of those who is. I love it, and I know how valuable the data is, and besides, what better work environment could one ask for?



Banded plover, bb:lb, aka "Bubbles". Photo credit: Susanne Meyer

Make a gift today to support local conservation!

We invite you to join us in supporting this treasured Reserve. Your generosity will help advance innovations in science, conservation, and education at the Reserve while protecting this unique and important environment. Donations to Coal Oil Point Reserve are well leveraged by support from the University of California. An investment today will celebrate the 50-year legacy of Coal Oil Point Reserve and help set a continued course for excellence in research, learning, and the stewardship of one of the best examples of native California coastal environments.

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