

# UC Santa Barbara

## Newsletters

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UCSB Restoration Register - July 2023

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UC **SANTA BARBARA**  
Cheadle Center for Biodiversity  
& Ecological Restoration

# Restoration Register

July 2023



Bewick's Wren at NCOS. Photo by Susan Cook.

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**Updates**

## Tidewater Gobies found on NCOS!



Tidewater gobies found at Phelps Creek bridge.

Exciting news! Tidewater gobies (*Eucyclogobius newberryi*) have been found at the Phelps Creek Bridge during our annual survey on June 21st. This marks the first time they have been found on NCOS since restoration began. Tidewater gobies are small fish (0.6-2 inches) found in brackish water lagoons, estuaries, and marshes along the California coast. Historically, tidewater gobies are known to have inhabited 150 lagoons and estuaries along the coast, however in the 1980s researchers discovered that tidewater gobies were disappearing from many locations. In 1994, the tidewater goby was listed as endangered under the Endangered Species Act.

Our annual Tidewater goby survey involves seining and dipnetting at eight locations on Coal Oil Point Reserve and the North Campus Open Space. In total, we found 63 Tidewater gobies as well as other fun finds including a single Arrow goby (*Clevelandia ios*) and five Pacific staghorn sculpin (*Leptocottus armatus*) - as well as the usual finds: 46 California killifish (*Fundulus parvipinnis*), 25 longjaw mudsuckers (*Gillichthys mirabilis*), and 202 topsmelt (*Atherinops affinis*).



Cheadle Center staff seining in the eastern arm of Devereux Slough on NCOS.



Pacific Staghorn Sculpin.

***Salt Marsh Bird's Beak***



Salt marsh bird's-beak (*Chloropyron maritimum* ssp. *maritimum*) beginning to flower at NCOS.

The salt marsh bird's-beak (*Chloropyron maritimum* ssp. *maritimum*) is a State and Federally endangered annual herb in the Orobanchaceae, or broomrape family. This plant family is mostly parasitic or hemiparasitic in nature and includes the beautiful wildflowers owl's clover and Indian paintbrush in the genus *Castilleja*. Like these, the salt marsh bird's beak is a hemiparasite, meaning it is a partial parasite. They make some of their own sugar through photosynthesis, but grow disproportionately large flowers and small leaves, so they must parasitize nearby plants for the remaining nutrition they need.

Salt marsh bird's-beak occurs naturally in Southern California salt marshes from Carpinteria down into Northern Baja, but oddly was never observed or collected in the Goleta or Devereaux sloughs. Since all the distinct wetlands in Southern California that support salt marsh bird's-beak bear different local forms of the plant, the seed we introduced to NCOS was from the nearest occurrence to campus, the Carpinteria salt marsh. In the spring of 2023 these seeds were introduced into numerous experimental sites around the newly restored marsh in collaboration with Tidal Influence and the USFWS. Several months later, approximately 40 plants are growing and the future of the plant in the Devereux slough is looking good. At last count, 45 of them are growing and just beginning to flower. We are excited to see how the population grows and if it will expand into places in the lower Devereux slough from seed produced in our site.



Salt marsh bird's-beak (*Chloropyron maritimum* ssp. *maritimum*) grows among saltgrass (*Distichlis spicata*) and pickleweed (*Salicornia pacifica*) in the south eastern saltmarsh at NCOS.

## ***New Zealand Mudsail***

Our aquatic eDNA sampling has found a match with the invasive New Zealand mudsnail (*Potamopyrgus antipodarum*) in Phelps Creek, and we have verified this through hand sampling and identification by a local expert. The New Zealand mudsnail has not been reported in Santa Barbara County yet so we are doing everything we can to prevent the spread of this invasive species! These aquatic snails are very

small (less than 6mm) with an elongated, right-handed coiling shell, usually consisting of 5-6 whorls. They can rapidly reproduce and may eventually consume up to half of the food resources in a stream, which leads to reduced populations of native aquatic insects and fish species.





This rock at Phelps Creek may appear bare at first glance, but closer inspection reveals tiny New Zealand mudsnails.



Magnified image of the rock above showing New Zealand mudsnail.

***Bringing Back Our Wetland Showing***



Stars on stage! From left to right: Colleen Grant, Katherine Emery, Lisa Stratton, Michael Love, Carla D'Antonio, and Wayne Chapman at the June 1st showing of *Bringing Back our Wetland*.

"*Bringing Back our Wetland*" was shown to an enthusiastic audience of nearly 300 community members on June 1st at the Marjorie Luke Theater. Michael Love's documentary tells the story of how the NCOS Restoration Project came to be. The next public showing is tentatively planned for Tuesday, September 12th at the Santa Barbara Maritime Museum.

## Feature Story

### *Restoring Vernal Pools*



Manzanita Village Vernal Pools

What a wonderful year for vernal pools! Popcorn flowers, dwarf woolly heads, clam shrimp galore! Have you seen these tiny plants and animals popping up around campus? Vernal pools are temporary wetlands that are entirely rainfed. They form when rainwater pools atop a subsurface impermeable soil layer, popping up in depressions in the landscape during California's wet winters. Plants and animals with special adaptations grow and reproduce quickly during the spring before the pools completely dry out during the summer. Due to degradation and land conversion, only 5% of historical vernal pool habitat still exists in California today. We are lucky to have some of the remnant vernal pools right in our backyard around UCSB!

Because of their widespread degradation, restoration efforts began in the 1980s, with some of the first restoration efforts occurring in Isla Vista. Now, the Cheadle Center has restored and created over 50 vernal pools around campus. Vernal pools can be easily overlooked during the summer or during drought when they are just dry patches in the landscape, but this year, they are popping! Native vernal pool species are resilient because their seeds can lie dormant in the soil until the conditions are just right for them to emerge. The Cheadle Center seeded their new vernal pools with locally collected seed, but not all plants grow every year because there is not enough pooling of water or because they are out-competed by non-native species. The Cheadle Center has been hard at work weeding out non-native grasses and bur clover, and this year, the heavy rains filled up the pools to capacity to allow for native species to flourish. Let's take a look at some of these unique vernal pool species!



Map of all the vernal pools (highlighted in blue) around UCSB.



The pools at South Parcel filled up to full capacity in February 2023. Credit: Nick Thomas.



This pool at South Parcel is now bursting with life, including coyote thistle (*Eryngium vaseyi*), popcorn flower (*Plagiobothrys undulatus*), and dwarf woolly heads (*Psilocarphus brevissimus*). Credit: Joanna Tang.



Beautiful owl's clover (*Castilleja densiflora*) rims the pool. Credit: Joanna Tang



Pacific foxtail (*Alopecurus saccatus*; right) and Lemmon's canary grass (*Phalaris lemmonii*, left) are native grasses that are only found in vernal pools. Their seeds have remained dormant in the soil for several years before germinating after this year's rains! Credit: Joanna Tang





It's a whole new world down here! These tiny charismatic wildflowers, white popcorn flower (*Plagiobothrys undulatus*), green-tinted dwarf woolly heads (*Psilocarphus brevissimus*), and red-tinted aquatic pygmy weed (*Crassula aquatica*), carpet the bottom of the vernal pools. Credit: Joanna Tang



Coyote thistle (*Eryngium vaseyi*) is one of the species that has special adaptations for living both under and above water. The young plant in the center of the photo germinated underwater and developed thin straw-like leaves that allowed the plant to “drink” air above the water. The larger plant surrounding it shows its mature leaves that splay out after the pool dried to maximize photosynthesis. Credit: Joanna Tang

Plants are not the only species that make vernal pools their home. The dominant wildlife community in vernal pools is aquatic invertebrates. Student intern Alyssa Jain is researching exactly what species of seed shrimp (*Ostracoda*), *Copepoda*, clam shrimp (*Branchiopoda*), and water fleas (*Cladocera*) are present in the local pools. These tiny crustaceans vary in size from a grain of sand to a small bean and are difficult to identify visually. Therefore, Alyssa is developing a new methodology for using DNA extraction to identify species swimming in the water column. This approach is based on fragments of DNA, known as “eDNA,” found in the environment. These aquatic invertebrates can only grow, swim, and reproduce when the pools are full of water during the winter and spring. Some species, like the clam shrimp, only emerge if the pool is flooded for months, so it has not been seen during the recent drought. This year, we were super excited to find clam shrimp in the vernal pools in More Mesa and Lake Los Carneros Park!



Click on the image to see video! Clam shrimp at More Mesa. Credit: Parry Gripp



Cysts (eggs) of aquatic invertebrates dot the bottom of the pool after it dries up. These cysts can survive the dry phase of the vernal pool. Credit: Joanna Tang

As you can see, the local vernal pools are teeming with life. However, many of the unique vernal pool species found elsewhere in California are locally extinct in Santa Barbara. As a graduate student at UCSB, my research focuses on understanding why these vernal pool species are missing and what restoration methods can increase native diversity. One of the main threats to native biodiversity is invasive species, such as annual European grasses. These grasses grow quickly and die every year, leaving a lot of dead plant matter, or thatch, on the landscape. Previous research has shown that this thatch layer inhibits the germination of native species. I perform timed weeding and seeding treatments to see if weeding out this thatch layer and adding native species can decrease non-native diversity and increase native diversity.

My favorite part of my research has been watching the local vernal pools ebb and flow each season. It is so exciting to see the landscape change from a barren dryland to a pool full of mallards to a beautiful floral display. It is also inspiring to see the native species take over a landscape amidst competition from non-native species, and to see native species bounce back after drought.

It is so special to be able to live with these ecosystems right in our backyards, to observe their resilience, to understand their functionality, to tend to their needs. One of my main takeaways from my research has been changing my perspective of restoration. There is no one-size-fits-all silver bullet that can instantly change a degraded landscape into native habitat. Ecological restoration requires restoring the relationship between humans and the land. For me, it is a joy to see a new restoration site dotted with undergraduate students hard at work installing native plants and weeding out non-native plants. I love watching the scales fall from their eyes when I explain to my interns that the dry grassland they have been trudging through on the way to campus is home to endangered vernal pools.



One of the newest vernal pools at North Campus Open Space, created in 2019, is flourishing with native species. Credit: Joanna Tang

The Cheadle Center has put countless staff, student workers, interns, and community volunteers to work on the land, transforming the open spaces into outdoor classrooms where community members live, learn, play, and work. The idea of long-term management often gets flack in our fast-paced society that is so often focused on instant gratification and quick fixes, but restoration is truly a labor of love. If we pivot from viewing restoration as a quick intervention to viewing it as a long-term commitment to learning about an ecosystem and understanding how we can help it thrive, we can truly reap the benefits of restoration. Restoration is a way of life, a community effort wherein we take care of our natural home so that it, in turn, takes care of us. In addition to being beautiful places to work and play in, native habitats are safe places that mitigate the risks of floods and fires. As a community coming together to observe, understand, and steward the unique ecosystems

surrounding us, we can restore not only the beautiful endangered ecosystems but also the joy of living in a harmonious relationship with nature



Click on the image to see video! Camino Corto (left of road) and Del Sol (right of road) vernal pools in Isla Vista.  
Credit: Nick Thomas

Article by Joanna Tang.

PhD Candidate, Department of Ecology, Evolution, & Marine Biology  
University of California, Santa Barbara

## Volunteer Opportunities



**"Second Saturdays" at NCOS**

**July 8th, 9:00 - 12:00**

Please RSVP to [ncos@ccber.ucsb.edu](mailto:ncos@ccber.ucsb.edu)

Help us restore and create NCOS with plants and more! Meet at 6969 Whittier Drive at 9am. Bring water, sunscreen, and wear a hat, clothes and shoes that are suitable for outdoor work

## Thursdays - CCBER Greenhouse Associates

**Thursdays 9:00 - 12:00**

Come help transplant seedlings of native plants with the CCBER team. To join, please send an email to [ncos@ccber.ucsb.edu](mailto:ncos@ccber.ucsb.edu).



## Nature Guide Tour

**July 15th, 9:30 - 11:00**

Come take a walk around NCOS and learn about native plants and animals with a trained Nature Guide.



## Community Photos

We are interested in any observations of wildlife activity on NCOS, as well as plants and landscapes. Please send your observations, with or without photos, to [ncos@ccber.ucsb.edu](mailto:ncos@ccber.ucsb.edu). Thank you!



Mallard family at NCOS. Photo by Susan Cook.



Gadwall family at NCOS. Photo by Susan Cook.





Canada goose family at NCOS. Photo by Jeremiah Bender.



Baby killdeer at NCOS. Photo by Susan Cook.



Juvenile Great-horned Owl at NCOS. Photo by Lynn Scarlett.



Western Bluebird at NCOS. Photo by Susan Cook.



Oak Titmouse at NCOS. Photo by Susan Cook.



Angry Mockingbird mobbing a Red-shouldered Hawk at NCOS. Photo by Susan Cook.



Wilson's phalarope in breeding plumage. Photo by Lynn Scarlett.

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**For more information on the  
North Campus Open Space Restoration Project, [Click here](#), or email [ncos@ccber.ucsb.edu](mailto:ncos@ccber.ucsb.edu)**

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