

The Jack and Laura Dangermond Preserve

An Annual Report

November 2024

The Nature
Conservancy



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Letter From the Director

Dear Dangermond Preserve supporters,

The Jack and Laura Dangermond Preserve is a place of extraordinary convergence—of land and sea, of hills and coast, and of ecological communities from Northern and Southern California. Thanks to your vision and leadership, it is also where science and conservation action meet, with my colleagues at The Nature Conservancy (TNC) using each strategically to inform and advance the other. Over the past year, the scientists and technology experts at TNC's Point Conception Institute (PCI) have made incredible progress in facilitating groundbreaking science: More than 95 research projects are now underway, and they are benefiting from our innovative data collection, processing, and sharing tools.

The knowledge being unlocked here on the preserve is, in itself, an important contribution to conservation. But for TNC, increased understanding is a means, not just an end. We are turning new knowledge into action—so that we can meet ambitious conservation goals at the preserve and beyond. As we detail in this report, we are hard at work advancing science-driven restoration projects aimed at rewilding the preserve's lands and waters. We are helping iconic species like coast live oaks to thrive and others—like the black abalone and Southern California steelhead—to return to their traditional habitat after a decades-long exile. We are also testing approaches and developing best practices for removing invasive species that harm habitats, such as the ice plant that suffocates the coastal dunes and the nonnative grasses that crowd out native species and raise fire risk.

In 2024, we have intensified our focus on a different kind of convergence: connecting people to this unique landscape. In one short year, our team has launched a robust suite of programs that enable nature lovers of all ages and backgrounds to visit, learn from, and be inspired by the preserve. With this work, we are helping to create a new generation of conservation champions who love the Dangermond Preserve as much as we do.

Jason Pelletier
Flagship Preserves Director



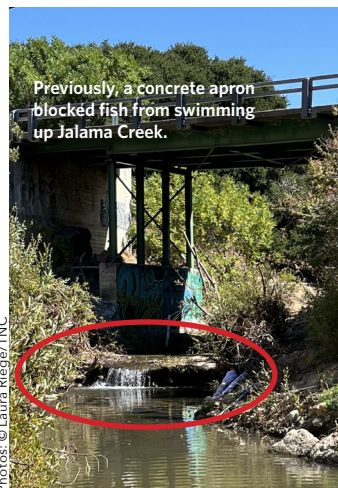
From Research to Action

Restoring the Jalama Creek Watershed

In last year's report, we celebrated the successful removal of the first of two human-made fish barriers in Jalama Creek. This year, we're pleased to report that we have removed the second barrier. For the first time in 50 years, 12 miles of Jalama Creek are open and accessible, so that fish like the endangered Southern California steelhead can swim upstream to safe spawning grounds.

Whereas removing the first barrier involved demolishing a concrete dam, in this year's project, removal of the barrier—a concrete apron under a bridge along Jalama Road—was not an option. Instead, we took a different approach, bringing in 400 tons of boulders and rocks from elsewhere in Santa Barbara County to build a 120-foot-long rock ramp, creating perfect stream habitat that enables fish to move over the apron structure. The project proceeded smoothly and went faster than planned, taking just two and a half weeks instead of the anticipated six.

To monitor the ecological effects of the dam removals, we have launched a large research partnership with the University of California, Santa Cruz (UCSC). Assessments conducted before and after the removal of the first barrier found improvements in several indicators of stream health, and we will continue monitoring both sites through 2028. Although we have not yet observed steelhead in Jalama Creek, we have observed stickleback upstream of the former site of the first barrier. To accelerate the return of steelhead to the creek, we are working with a postdoctoral researcher at UCSC, who previously worked in Atlantic salmon recovery in dammed rivers, to outline a pathway to recovery for the species.



Photos: © Laura Riege/TNC

Bringing Black Abalone Back From the Brink



© Walter Heady/TNC

The black abalone has historically been of great importance to both human and ecological communities along California's coast. For Chumash tribes, the marine snail has long been culturally important as a food source. It is also an important species that contributes to the health of rocky intertidal zone ecosystems. Once numbering in the millions, Central and Southern California populations of black abalone began to crash in the 1990s because of disease and overharvesting by commercial fishers. Today, they are endangered.

As part of the Black Abalone Recovery Team, a coalition of scientists and natural resource managers from several different agencies and institutions, TNC recently hosted pilot translocations of black abalone, moving about 250 individuals over two events in March and October 2023. In these events, we took abalone from a recovered population at TNC's Santa Cruz Island Preserve and rehomed them on the Dangermond Preserve's protected shores. Monitoring has shown that survival rates are quite high: 70% of individuals from the first translocation and 80% from the second have been found again.

Before we facilitated the translocation events, no one knew if this approach would work for black abalone. Because TNC could provide a safe coastal site where both land and waters are protected, we enabled risk-averse agencies to attempt translocation, and the high survival rates have shown them this approach is viable. Moving forward, the recovery team, with the help of TNC scientists, will focus on finding the next location where we can create a stronghold for black abalone, as well as ways to source individuals without taking them from wild populations. TNC is working with partners to conduct research into breeding black abalone in captivity—something that has not been successfully done before. If we can find an effective method for captive breeding, it would represent a major conservation advance.

Revitalizing Oak Woodlands and Grasslands

For several years, TNC has been working to restore and maintain oak woodlands on the preserve, in part to satisfy a requirement by the California Coastal Commission to remediate the previous owner's damage to this iconic habitat type. We are currently in the final year of monitoring our restoration site for Coastal Commission approval of our remediation efforts, and we are seeing encouraging results: The oaks are doing well, producing acorns and providing habitat for nesting birds.

In addition, we are advancing the rewilding of inland roads that were created by the previous owner as part of their planned development of the ranch. With these roads, we are taking a passive restoration approach, simply keeping people from driving on them and allowing them to restore naturally. We are using aerial imagery and Esri geospatial tools to monitor how the roads are changing over time. Comparing imagery from 2018 and 2023, we can see that most roads are essentially restoring themselves, as the lack of disturbance allows vegetation to grow and spread. In some places, it is difficult to see where the road used to be. In addition to aerial imagery, we are conducting field surveys to measure changes in the percentage of land covered by plants, as well as in the diversity of species.

We are also making progress in our efforts to restore the preserve's coastal terrace, where the endangered Gaviota tarplant used to thrive. Over the past year, we partnered with the California Native Plant Society to complete an initial assessment of Gaviota tarplant across the preserve, estimating the plant's population and footprint, as well as to develop and implement an annual monitoring plan. Together with an incidental take permit we received from the California Department of Fish and Wildlife, this information allows us to greenlight restoration activities specific to the Gaviota tarplant—and accelerates other projects that have been slowed by concern over potential impacts on the plant.



A red-winged blackbird's nest in one of the preserve's oak trees.

© Alyssa Berry/Padre Associates

A Haven for Monarchs



© LisaAnnPix/Shutterstock

Until a few decades ago, every winter, Californians were treated to the sight of millions of western monarch butterflies sojourning along the coast. Today, thanks to loss of habitat and other factors, populations of this migratory species are only 5% of what they were in the 1980s. Each year, the Xerces Society for Invertebrate Conservation conducts a count of western monarchs, and in recent years, the numbers have dipped incredibly low—for example, in 2020 only about 2,000 individuals were found across the entire state. Results for the November–December 2023 count, released in early 2024, have shown substantial improvement. More than 233,000 butterflies were counted across 256 sites, and the largest population at a single site—more than 33,000 individuals—was counted right here on the Dangermond Preserve. That's the second year in a row the preserve has earned this distinction, illustrating the importance—and the benefits—of protecting precious coastal wildlands.

Innovating Conservation Science and Technology

Point Conception Institute Updates

PCI moved beyond its startup phase, in which we laid the conceptual and technological foundation for harnessing the power of open, data-driven science to solve the world's most pressing conservation problems. In its next phase, PCI is focused on expanding research collaborations; refining our open data collection, management, and information systems; and spreading our tools and learnings to other preserves and partners for even greater impact. Our 2024 achievements include the official launch of the PCI Field Station, the launch of the Dangermond Preserve Geospatial Hub, the expansion of foundational research and geospatial research opportunities with a special focus on fire and water, improvements to our networks and data-sharing infrastructure, and the convening of catalytic meetings and working groups. Other highlights include the following:

Honors From NASA: In July, PCI Director Mark Reynolds attended the National Aeronautics and Space Administration's (NASA) first-ever Early Adopter Showcase to present on our successful collaboration with NASA on the Surface Biology High-Frequency Time Series (SHIFT) project, a first-of-its-kind effort to document large-scale seasonal change in vegetation of Mediterranean ecosystems through weekly flyovers coupled with ground-based sampling. While there, Dr. Reynolds accepted a NASA Early Adopter Award on behalf of PCI—an honor bestowed for PCI's role in developing conservation applications for data from NASA's Surface Biology and Geology mission.

Expanding Data Access: We have launched the public Dangermond Preserve [Geospatial Hub](#), where anyone can learn about preserve research projects and access primary data, tools, and StoryMaps. We have expanded our on-site monitoring network to include operational sensors that monitor water systems and vehicles, as well as sensors for research, such as weather stations and wildlife cameras. We use data from this network in everyday decision-making, as well as to lay the foundation for deeper, more synthetic research. Finally, we have been working with several partners to model and forecast our freshwater systems and biodiversity shifts under changing climates. This work will soon be integrated into our more public-facing platforms. Take a look at the Projects menu on the Geospatial Hub to see more of the emerging themes and projects for which we are deploying geospatial data, models, and tools to deliver conservation results. In this [Esri article](#), you can learn more about how our work on the Dangermond Preserve Digital Twin is fostering open science.

PCI Science Symposium: In March 2024, we held the second annual PCI Science Symposium at the University of California, Santa Barbara (UCSB), where more than 120 members of the conservation research community gathered to learn about research taking place on the preserve and explore future collaboration opportunities. For more details, check out our [full report](#) on the day, which includes session recordings and slides.





Convening and Collaborating at PCI

PCI is more than a facility—it is an incubator where we strategically convene partners, ideate transformative work, and catalyze that work. The active role we take accelerates the pace of translating data into action and spurs guests of the institute to think bigger and bolder about conservation solutions. These photos show a sampling of the workshops and events we held in 2024 at our new PCI Field Station and beyond.

Photos, clockwise from top left: At the "Prescribed Fire as a Conservation Tool" workshop, PCI convened researchers and fire practitioners to identify needs, challenges, and opportunities to further beneficial burning. © Kelly Easterday/TNC • Attendees of PCI's Open House check out the new facilities. © Gabriela Morales/TNC • A meeting of PCI, NASA, and other key partners to plan the next phases of the SHIFT program. © Mark Reynolds/TNC • PCI hosted a meeting of the E.O. Wilson Biodiversity Foundation, and attendees toured the preserve. © Mar Y Sol Productions • PCI staff and partners at a meeting of the Coastal Consumers Working Group. © Walter Heady/TNC



A Novel Method for Monitoring Ice Plant

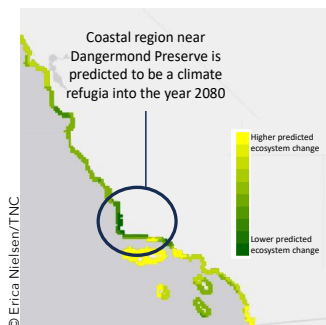
One of the conservation applications of NASA Earth observations that the agency celebrated with its Early Adopter Award to PCI is the use of hyperspectral satellite data—imaging that records the full spectrum of light reflected by the Earth’s surface—to detect and monitor the presence of ice plant. About 1,000 acres of the Dangermond Preserve is covered with this species, which was introduced from South Africa in the early 20th century to stabilize drifting sand that was disrupting operations along the coastal railway. The species turned

out to be invasive, spreading quickly, outcompeting native plants, and turning thriving coastal ecosystems into deserts. As part of our efforts to remove ice plant from the preserve and restore its coastal dunes and plains, and as part of PCI’s SHIFT project with NASA and UCSB, we created a model that could ingest hyperspectral data—and the information it gives us about the chemical signatures of vegetation on the ground—to identify precisely where ice plant is and observe how ice plant cover grows or shrinks over time. This first-of-its-kind model is helping us map and monitor ice plant on the preserve to inform our removal efforts and track their success.

Research Spotlight

Understanding and Preparing for the Preserve’s Climate Future

Because the Dangermond Preserve sits at the meeting point of two different ocean ecosystems—one adapted to colder northern waters and the other adapted to warmer southern waters—it is an ideal place to study the potential effects of climate change on coastal flora and fauna. Given that there is already great variability in ocean temperatures around Point Conception, studying ecosystems here can tell us a lot about species’ vulnerability to warming. The convergence of ecosystems also raises the possibility that for at least some species, the preserve could be a refuge or stronghold as climate change causes ocean conditions to veer widely from long-term trends, since local species have already adapted to a wide range of conditions. In her first year at PCI as the inaugural Anthony LaFetra Research Fellow, Erica Nielsen, Ph.D., has been exploring these questions, and her investigation has led her down two different but related paths.



Identifying Resilient Strongholds

Synthesizing geospatial climate data with a database of field observations, Dr. Nielsen is working to understand how different species are distributed at different rocky intertidal habitat sites and to relate those distributions to the environmental conditions at the site. From this synthesis, she is creating spatial maps that reveal areas along California’s coast where we can expect ecosystems to be more resilient, termed climate refugia. These maps can be used to identify which of these places are not already protected but should be. She is currently preparing a manuscript on this work for publication.



Investigating a New Restoration Pathway

As to whether the preserve itself could be a climate refuge for certain species, Dr. Nielsen has been investigating the possibility of restoring certain foundational species to make ecosystems more resilient. In rocky intertidal zones, one such foundational species is a type of algae called golden rockweed (*Silvetia compressa*), which provides a protective canopy for other algae, plants, and animals. At the Dangermond Preserve and elsewhere, rockweeds are in decline, and restoration efforts have been successful only when adult plants and the rocks they are attached to are translocated to the restoration area. This type of translocation work is difficult to scale up for several reasons, including that the offspring from translocated adults often don’t survive. So, Dr. Nielsen is working with Halley Froehlich, Ph.D., an assistant professor of marine biology at UCSB who specializes in aquaculture for restoration, to test methods for growing rockweed in a lab—something that has not yet been done. A pilot experiment is underway this fall, and if it is successful, the team will experiment with outplanting lab-grown specimens on the preserve.

Facilitating Smart Fire Management

Over the past year, our conservation technology team has been working to expand the tools available to support management decisions on the preserve and beyond. One such tool helps us determine where and why to put beneficial fire on the landscape. Preserve habitats are adapted to periodic fires, which play an important role in ecosystem function and health. Human activity, climate change, and the proliferation of nonnative plant species have altered the natural fire cycle, depriving ecosystems of the benefits of occasional, less intense fires and leaving them vulnerable to out-of-control megafires. By reintroducing fires in an intentional way, we can help habitats recover while also reducing the risk of destructive fire.

To facilitate the use of beneficial fire, for the past several years we have been leading a series of Prescribed Fire Training Exchange (TREX) trainings to help build the prescribed burn workforce, better understand the effects of beneficial fire, and learn how and where to burn on the preserve for greatest benefit. The next TREX is taking place on the preserve in November, and we expect 50 participants. This year, the TREX plan includes an

experiment that will help us understand the relationship between cattle grazing and fire. At one of the burn sites, we are installing an enclosure that will prevent cattle from grazing in that area. At the TREX site, we will burn this plot and the land around it, and then we will monitor the recovery of the nongrazed sections in comparison with that of grazed sections.

Our new [fire-management decision support tool](#)—which pulls in fire hazard maps from CAL FIRE, vegetation structure maps, and infrastructure maps—is supporting TREX planners by helping identify the safest and most ecologically beneficial locations at which to conduct burns. It also informed the preserve’s newly updated and finalized fire management plan, which includes protocols for responding to unplanned fire on the preserve. These types of tools and maps are critical in both our planning of intentional prescribed fire and our reaction to wildfire. Our team has been partnering and collaborating well beyond the Dangermond Preserve to use remote sensing, GIS, and actionable insights to be more prepared in the event of a wildfire. Lessons learned from recent fires at sister sites—such as the Lake Fire that burned nearly half of the University of California’s Sedgwick Reserve and the Park Fire that burned more half of TNC’s Dye

Creek Preserve—are top of mind and remind our team of the seriousness of our work and the reasons to keep innovating and striving for expedited pathways from data to action. You can view all the data, models, and tools related to fire at the preserve on our [Geospatial Hub fire project page](#), including our [Dangermond-specific decision support tool](#), our [regional fire condition monitoring tool](#), and a [StoryMap on fire management](#) at the preserve.



Participants in the 2023 TREX conducting a controlled burn at Sedgwick Reserve.

Research Spotlight Coastal Protection and Surf Zone Fish

the coast of mainland Southern California.) Dr. Dugan and her team found that marine protected area management enhances populations of fish in the surf zone, many of which are economically important species. Compared with other locations in the study, the Dangermond Preserve and surrounding waters contained the highest species diversity of surfperch, and the age structure of one species—*Amphistichus argenteus*, or barred surfperch—was especially robust, meaning the populations of younger and older fish were similar in size. High species diversity and robust age structure are indicators of ecosystem health, and they speak to the benefits and importance of protecting both land and sea along California’s coastline. These findings were recently published in the journal [Conservation Biology](#).

PCI’s work with UCSB on coastal biodiversity is extending our understanding of the importance of protected areas. A team of researchers led by Jenny Dugan, Ph.D., has been investigating the performance of California’s network of marine protected areas, including the Point Conception State Marine Reserve, which is adjacent to the Dangermond Preserve’s southern coast. (Together, the Dangermond Preserve and Point Conception State Marine Reserve constitute the largest marine and terrestrial protected area along

Engaging and Serving Local Communities

Public Programming Takes Off

An important goal at the preserve is to connect people with this special landscape that has been off-limits to the public for more than a century—and in the process, increase public awareness of TNC’s work and support for conservation. Since her arrival in 2023, Outreach Manager Lorren Butterwick has been hard at work standing up programs to increase managed access for communities in nearby Lompoc and beyond. In April 2024, TNC launched a series of free walking tours on the preserve, including a whale watch walk and a bird-watching walk, as well as four walks led by naturalist Joel Robinson, head of the environmental education nonprofit Naturalist for You. Robinson infused his walks with traditional ecological knowledge, guiding up to 12 participants along an inquiry-based journey emphasizing immersion in and close observation of nature. All six walks held in 2024 booked up immediately, and participants greatly enjoyed the experience. Over the next year, TNC will expand the program, adding the capacity to host more walks by enlisting volunteer docents and training them with a curriculum developed by Robinson.

TNC also launched a Wild Coast Steward program this year, hosting volunteer days in which participants helped with activities like trail maintenance. As with the guided walk program, in 2025 volunteer docents will help us increase the number of Wild Coast Steward events we can host. To date, more than 300 people have joined the interest list for the program. In addition, we have partnered with local organizations Explore Ecology and the Lompoc YMCA to offer a program called Creative Connection With Nature, in which YMCA summer campers ages seven to 12 visit the preserve to participate in creative, hands-on activities that promote a deeper connection with and sense of belonging in nature.



Finally, we have been exploring opportunities to facilitate meaningful preserve access and programming for Chumash communities, including family days and basket-weaving workshops on the preserve, an environmental education curriculum for elementary schoolers, a cultural camp for eight- to 12-year-olds, and a conservation job-training program for teenagers.

Advancing the Environmental Education Program



To inspire new champions for nature, we are continuing to expand our efforts to reach students at local schools, connecting them to the preserve’s landscapes and ecosystems and helping them see themselves as future scientists or conservationists. Now in its third year of delivering learning experiences for middle- and high-school students in the Lompoc Unified School District (LUSD), our environmental education program continues to grow and evolve. Several years ago, TNC partnered with environmental education group NatureBridge to develop the program’s curriculum, which we piloted in 2022 with a series of day and overnight programs for LUSD high schoolers and seventh graders. In 2023, we honed our focus to day programming and expanded our offerings to include all LUSD seventh graders.

This year, we completed the successful partnership with NatureBridge, and that group is assisting with the transition of day-to-day program implementation to a local partner—a program of UCSB’s Cheadle Center for Biodiversity and Ecological Restoration called Kids in Nature.

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Over the 2023–2024 school year, Kids in Nature led eight day trips on the preserve, using the curriculum developed by NatureBridge to immerse students in nature, foster their connection with the preserve, and build their science and ecological literacy. Feedback from educators was overwhelmingly positive. One teacher noted that their students “were so excited to be outside. It was so novel to them to do that for a full day. The experience of spending the whole day in their own backyard was exciting ... Very few of them had exposure to that before.” Another reported that “the opportunity to talk with the UCSB students was a highlight for many of the students as well. Some students have found more interest in

environmental studies. That trip may have given them inspiration for jobs in the environmental field.”

Together with Kids in Nature, we will continue to deliver high-quality learning experiences on the preserve throughout the current school year. As mentioned above, we are also working with the Santa Ynez Band of Chumash Indians to develop environmental education programming for Chumash youth. In addition, we are beginning to explore how we can export the Dangermond Preserve’s environmental education model to other TNC preserves in California.

Visitation by the Numbers

Wild Coast Steward Program

Workdays so far: 5

Volunteers: 44

Public Tours

Naturalist Walks: 4

Whale Watching Tours: 1

Birding Walks: 1

Participants: 69

Creative Connection With Nature Program

Events: 2

Student participants: 62

Environmental Education Day Trips

Visits: 8

Seventh-grade participants: 200

High-school participants: 71

Schools served: 4



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Infrastructure for Impact

In 2024, we continued to make progress on a number of infrastructure improvement projects aimed at increasing our conservation, research, and visitation capacity.

Building Renovations

At Jalama Headquarters, we completed renovations of the erstwhile home of former ranch manager Gordon Davis. Now known as the Volgenau House, the building serves as our primary visitor check-in and staff meeting space. With the funding commitment of a generous donor, we are undertaking a renovation of the historic Jalama Barn so that the preserve will have a facility large and flexible enough to support the technology and equipment needed for transformative restoration projects and world-class land stewardship, as well as a modern, comfortable convening space for large groups. This project is in an early phase; we have contracted initial designs and are awaiting permit approval from the County of Santa Barbara. With timely permit approvals, we expect to begin construction in 2026.

On the Cojo side of the preserve, the former schoolhouse has been fully renovated and furnished, and the Cojo manager's house has received key repairs. Both are in use as facilities for TNC staff who need access to the preserve. We are also in the early stages of renovating outbuildings at the Cojo Headquarters to support stewardship, restoration, and research activities and

provide secure and climate-controlled storage for samples and equipment. Designs for these renovations are now awaiting permits from the county's Building and Safety Division.

Telecommunications Towers

After a protracted permitting process, we are pleased to report we have broken ground on replacing the preserve's Bunker Hill and Repeater telecommunications towers. When the new towers are in place and all instruments have been added or reinstalled—which we expect to be done by the end of November—Wi-Fi connectivity will be improved for radios, cell phones, and networked stations across the preserve.

Road Repairs

The past two winters of heavy rains have taken a toll on the preserve's paved roads, and there are seven locations in need of repair. Two sites along Cojo Bay Road are close to receiving permits to move forward with repairs. If the permits come through soon enough, we will complete the work this year; otherwise, we will wait until the spring to avoid potential heavy rains over the winter. Additional repair sites are located along creeks and streams across the preserve, which will give us the opportunity to incorporate into their design stream crossings aimed at improving watershed health.

With Our Thanks

The science, restoration, education, and outreach work we carry out at the preserve every day would not be possible without the generosity of our committed supporters and the collaboration of partners in government, academia, and local communities. We are proud of the progress we have made so far—and excited about the growth we will achieve in times to come. From all of us at TNC, thank you for your partnership and your trust as we work together to protect, rewild, and learn from this extraordinary place.

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