

Summer 2022 Update

The Point Conception Institute

Collaboration, Open Science, and Technology for Conservation Impact

The Point Conception Institute (PCI) is a global conservation enterprise based at The Nature Conservancy's (TNC) Jack and Laura Dangermond Preserve. PCI harnesses the power of open science to tackle urgent global challenges related to climate change and biodiversity loss through 1) diverse research collaborations, 2) data stewardship and sharing, and 3) innovative technological solutions.

RESEARCH HIGHLIGHTS

Since its inception, PCI has facilitated over 70 research projects from over 20 institutions (see list below). The interest we are seeing from leading research institutions is a testament to the scientific opportunities at the Dangermond Preserve and to the potency of PCI as a collaboration catalyst. In particular, the University of California, Santa Barbara (UCSB) research projects funded by the Zegar Family Foundation have created valuable learning opportunities for PCI in developing an innovative approach to high-impact scientific collaborations.

Project SHIFT

PCI's partnership with NASA's Jet Propulsion Lab and University of California on Project SHIFT (Surface Biology and Geology High Frequency Time series) is a first-of-its-kind deployment of weekly AVIRIS (Airborne Visible/InfraRed Imaging Spectrometer) optical sensor technology



Piper Lovegreen/UCSB | NASA-JPL's Dana Chadwick and Project SHIFT team at Dangermond Preserve.

and on-the ground sampling of southern California coastal vegetation. Project SHIFT is designed to calibrate and validate vegetation observations for NASA's Surface Biology and Geology (SBG) mission and, for the first time, to document large-scale seasonal change in vegetation of Mediterranean ecosystems through weekly flyovers coupled with ground-based sampling. The Project SHIFT team recently completed 15 weeks of sampling, compiling 6 terabytes of imagery and vegetation samples.

Discoveries at Dangermond Preserve: StoryMap

Take a look at this [StoryMap](#) to get a view into some of the ongoing bodies of work taking place at the Preserve. We worked with an amazing group of communications capstone students from UCSB's Bren School of Environmental Science and Management who were able to meet and interview researchers to compile this interactive look into "Discoveries at the Dangermond Preserve."

Wild Coast

We took a deep dive this year into the historical ecology of two important places on the Preserve: the sand dunes at Point Conception and the creek outlet at Percos Beach. Working with the San Francisco Estuary Institute, we were able to compile the first T-sheets, written observations, and other historical materials to tell the recent historical narrative of these places. We then worked with an artist, Laura Cunningham, to envision a "wild and resilient" future for these places. Follow [this link](#) to experience Point Conception and Percos Beach, to learn about their ecological and cultural history, and to imagine their restoration potential. These stories constitute a starting place for envisioning the restoration of resilient, biodiverse ecosystems throughout the Preserve, and renewing Chumash connection to the area.

TECHNOLOGY AND SENSORS

Over the last year, we have been hard at work on network expansion, sensor installations, and system development.

On the networking side, we now have an operational LoRaWAN network in place at the Preserve. This network provides low-power, low-cost plug-and-play networking opportunities for partner sensors and instrumentation. This is a really cool way to be able to deploy low-cost, battery-



© Kelly Easterday/ TNC | From left to right: Installing a water level sensor; Weather Station at Jalama HQ; Installing the Motus tower at Bunker Hill.

powered sensors with minimal infrastructure in many more places. Curious about how you might take advantage of this in your research? Come talk to us.

Sensor installations have also been a growth and focus area in this last year with both PCI and partner-led installations, including of a radio-telemetry system to track migratory birds in partnership with TNC, called [Motus](#).

We also added four new weather stations to our growing network (Jalama HQ, Army Camp, Bunker Hill, Repeater) which are the first of about a dozen to be deployed within the next year. You may be familiar with our [dashboards](#) or our [historical imagery viewer](#), but what about our weather data? [You can now find, query, and download the latest weather from the Preserve](#). We are hard at work to bring our newly deployed stations into the interface; they will be publicly available soon.

At the systems end we are working to develop systems to host, serve, and integrate data. More to come in this arena, but if you are ready to submit your research data or want to see published research data from nearby, check out our recently re-configured [Dangermond Preserve Research Repository for Data Discovery \(R2D2\)](#).

PCI INITIATIVE VISIONING WORKSHOP

In March 2022, TNC and partners gathered for an initiative visioning workshop. The gathering allowed us to share some of our collective progress through exciting lightning talks presenting results from the field, a keynote session exploring pathways and horizons to extend PCI's impact, and many breakout sessions to gather feedback and momentum on initiative development.



© Ginger Gillquist/TNC | Inaugural PCI Workshop participants hosted at NCEAS.

Most importantly, this gathering strengthened the community around PCI—a community coming together to drive research collaborations and integrated, data-driven solutions to the world's most pressing conservation challenges. It was heartening to hear people speaking of “we” when describing PCI. Please see the links listed below for more information.

[Participant List](#)

[Folder of Presentations](#)

[Folder of Photos](#)

COLLABORATIONS

A team including Dr. Lilian Pinteá, VP of Conservation Science from the Jane Goodall Institute; Dr. Deus Mjungu, Director of Research at Gombe National Park in Tanzania; and David Gadsden, ESRI's Director of Conservation Solutions, visited the Dangermond Preserve in April, 2022. We spoke about the many similarities and challenges of our respective work in California and Tanzania. There was excitement and overlap in the research both of our Preserves are conducting, IoT (internet of things), geospatial science, and environmental education. We were rejuvenated from the visit and discussed opportunities to further strengthen a bi-hemisphere "sister-site" relationship between the Dangermond and Gombe Preserves.



© Kelly Easterday/TNC | From left to right: Dangermond Preserve's (DP) Elizabeth Hiroyasu and Mark Reynolds; Dr. Deus Mjungu; Lilian Pinteá; David Gadsden; and PCI's Kelly Easterday.

PEOPLE

New Dangermond Preserve Director: Ben Miner

After a very lengthy and competitive search, we are happy to report that TNC has selected a new director for the Jack and Laura Dangermond Preserve. His name is Ben Miner, and he started with TNC in early July. Ben is currently the chair of the Biology Department at Western Washington University, where he has worked as a professor, researcher, and administrator since 2006. Ben also has a background in construction and infrastructure management and has familiarity in the field station domain from his deep experiences working at places like the Bodega Marine Laboratory and Friday Harbor Laboratory.



New PCI Technology Associate: Jinsu Elhance

Jinsu is currently finishing his master's at King's College in London. His research focus is on the integration of remote sensing and participatory GIS for the mapping of ecosystem services, particularly for the purpose of habitat restoration. He also holds a B.A. in Data Science from University of California, Berkeley, with a focus on social welfare, health, and development. Jinsu will be working on all things data science with a particular focus on the freshwater digital twin work for PCI and the Dangermond Preserve.



MEDIA

Project SHIFT

- NPR's Blue Dot: <https://podcasts.apple.com/us/podcast/blue-dot-science-and-californias-last-perfect-place/id1070613910?i=1000565143969>
- JPL: <https://www.jpl.nasa.gov/news/california-field-campaign-helping-scientists-protect-diverse-ecosystems>
- NASA: <https://www.nasa.gov/feature/jpl/california-field-campaign-helping-scientists-protect-diverse-ecosystems>
- NASA Climate: <https://climate.nasa.gov/news/3157/california-field-campaign-is-helping-scientists-protect-diverse-ecosystems/>
- UCSB: <https://www.news.ucsb.edu/2022/020609/dramatic-shift>
- UC NRS: <https://ucnrs.org/shift-campaign-links-plant-biodiversity-and-health-with-nasas-remote-sensing-technology/>
- Phys.org: <https://phys.org/news/2022-04-california-field-campaign-scientists-diverse.html>

Earth Day

- Santa Barbara Independent Cover Story on Dangermond Preserve
[Natural Highs on the Jack and Laura Dangermond Preserve: An Earth Day Update Five Years After Gaviota Coast Ranch Saved](#)
- Santa Barbara Independent Podcast - *The Indy*
[Celebrating Earth Week: A Look into Santa Barbara's Conservation Efforts](#)



PUBLICATIONS AND PRESENTATIONS

Cope, S., V. Zetterlind, B. Tougher, K. Easterday. Using machine learning to optimize autonomous tracking of vessels by marine radar. 2021 IEEE Oceans. [10.23919/OCEANS44145.2021.9705693](https://doi.org/10.23919/OCEANS44145.2021.9705693)

Rick TC, Braje TJ, Graham L, Easterday K, Hofman CA, Holguin BE, Mychajliw AM, Reeder-Myers LA, and Reynolds MD (2022). American Antiquity 1-18. <https://doi.org/10.1017/aaq.2021.154>

Gleason, M., M. D. Reynolds, W. Heady, K. Easterday, and S. A. Morrison. The importance of identifying and protecting coastal wildness. In prep for Conservation Science and Practice.

Sousa, D., F. W. Davis, S. Butterfield, K. Easterday, L. Riege, M. D. Reynolds. Predictive Ecological Land Classification from Multi-Decadal Satellite Imagery (2022), Frontiers in Forests and Global Change. <https://doi.org/10.3389/ffgc.2022.867369>

Genua, L., Anderson, B., Bowen, M., Ives, G., Liu, O., Paschos, T., J. Thorne, others. Successional dynamics in coastal vegetation on a fire-suppressed landscape. In prep for Madrono.

Robinette, D., and M. D. Reynolds. Shorebird populations and coastal resilience of the Point Conception, California region. In prep for Estuarine, Coastal and Shelf Science.

Wynn-Grant, R., and M. D. Reynolds. Coastal carnivores: ecological function, connectivity, and conservation. In prep for Conservation Biology.

Easterday, K., M.D. Reynolds, M. Merrifield, M. Bell, M. Goering, D. Wright. Building a Digital Twin of the Dangermond Preserve – the Last Coastal Wilderness in Southern California. 2021. Presentation. American Geophysical Union 2021 meeting.

PCI RESEARCH 2020-2022

Project Title	Institution	Principal Investigator/Point of Contact
Combining Historical Ecology with New Tools to Understand Climate Effects on Species Distributions	University of California, Santa Barbara	Steve Gaines
Developing and Implementing Novel Tools for Assessing Riparian Ecosystem Resilience	University of California, Santa Barbara	Kelly Caylor
Tracking Groundwater and Surface Water at Dangermond Preserve	University of California, Santa Barbara	Scott Jasechko
Human Settlement and Land Use at Point Conception, California	Smithsonian Institution	Torben Rick
Environmental Change and Remote Sensing of Mediterranean Vegetation in Southern California	National Aeronautics and Space Administration	Dave Schimel
Coastal Carnivore Conservation	University of California, Santa Barbara	Rae Wynn-Grant
Acoustic Monitoring of Tagged White Sharks	California State University, Long Beach	Christopher Lowe
Rocky Intertidal Biodiversity Surveys	University of California, Santa Cruz	Pete Raimondi
Biodiversity assessment and characterization of sandy beach ecosystems	Marine Science Institute	Jenifer Dugan
eDNA Detection of Biodiversity in Jalama Creek	University of California, Los Angeles	Maura Palacios Mejia

Gaviota Tarplant Genetic Studies	Dudek	Jake Marcon
Surveys for Endangered <i>Euphilotes</i> Butterflies	ManTech International Corporation	Alice Abela
Gaviota Tarplant: Protecting rare plants from invasive plants	California Invasive Plant Council	Jutta Burger
Investigating Fire and Grazing Effects on Historical vegetation at the Dangermond Preserve	University of California, Santa Barbara	Max Moritz
Beach Ecosystem and Shorebird Monitoring	Point Blue Conservation Science	Dan Robinette
Mapping and Dating Marine Terraces from Pt. Conception to Pt. Sal.	California State University, Long Beach	Nate Onderdonk
Seabird Movement and Foraging at Dangermond Preserve	TNC	Mark Reynolds
Survey and Collection of <i>Eriodictyon capitatum</i> and Habitat Suitability for <i>Dithyrea maritima</i> .	Santa Barbara Botanic Gardens	Matt Guillams
Large Wave Warning System (LAWWS)	Cooperative Institute for Research in Environmental Sciences (CIRES), University of Colorado, Boulder	Lincoln Pitcher
Western Monarch Thanksgiving Count	Xerces Society	Charis van der Heide
Strontium Isotope Ecology at the Jack and Laura Dangermond Preserve	University of California, Santa Barbara	Brian Holguin
A novel remote camera system that will improve response to oiled amphibians and reptiles	University of California, Santa Barbara	Christopher Evelyn
Documentation of Landscape Change at Dangermond Preserve	University of California, Santa Barbara	Hank Pitcher
Biodiversity assessment and characterization of beach ecosystems	University of California, Santa Barbara	Jenny Dugan
Regional herpetofauna biodiversity assessment	University of California, Santa Barbara	Christopher Evelyn
Population genomics of Western Pond Turtle, <i>Emys (Actinemys) pallida</i> at Dangermond Preserve.	University of California, Los Angeles	Brad Shaffer
Managing the impacts of environmental education in protected areas: a case study at the Dangermond Preserve	University of California, Santa Barbara	Tess Hooper

Using Historical Ecology to Guide Restoration and Management Planning at the Dangermond Preserve	University of California, Santa Barbara	Brad Anderson
Dangermond Preserve Phytojog	Cal Poly, San Luis Obispo	Matt Ritter
Lichen Flora of Dangermond Preserve	Althouse and Meade, Inc.	Jason Dart
Herbarium specimens of Hakea species (Proteaceae)	University of California, Riverside Herbarium, Botany	John Giles Waines
Variability in the Strontium Baseline at the Jack and Laura Dangermond Preserve	University of California, Santa Barbara	Brian Holguin
South Coast Bobcat Program	California Department of Fish and Wildlife, Region 5	Amelia Zuckerwise
Intertidal Monitoring	University of California, Santa Cruz	Pete Raimondi
Estimating Habitat Connectivity to Guide Wildlife Conservation and Management Planning at The Nature Conservancy's Jack and Laura Dangermond Preserve	University of California, Santa Barbara Bren School	Nikole Vannest
Southern Sea Otter Annual Range-wide Survey	U.S. Geological Survey, Western Ecological Research Center	Greg Sanders
Mechanistic controls on shale weathering	University of Nevada Reno	Joel Scheingross
Genetic architecture of migratory behavior in Allen's Hummingbird	University of California, Riverside	Nadje Najar
Isotopic proxies coupled to archaeological archives for investigating ocean climate regime shift impacts on Native American populations and marine ecosystems on the California Santa Barbara Channel	University of California, Santa Cruz	Natasha Vokhshoori
Understanding the fate of soil carbon from hills to rivers	California Institute of Technology	Michael Lamb
Coast live oak in changing environments	University of California, Santa Barbara	Frank Davis
Insect Barcode Initiative	Natural History Museum of Los Angeles County	Brian Brown
Marine Protected Area boundary mapping	MPA Collaborative Network	Calla Allison

Meadowlark Song Study	Unaffiliated	Elihu Gevirtz
Climate Sensitivity and Source Water Use by Riparian Groundwater Dependent Ecosystems in Coastal California	SUNY College of Environmental Science and Forestry	John Stella
Circulation of ticks and tick-borne pathogens at Dangermond	University of California, Santa Barbara	Cherie Briggs
Dynamic restoration of a rare headland bypass coastal dune system, Point Conception, California	Department of Geography, University of California, Santa Barbara	Madison Heffentrager
Paleontological Reconnaissance of the Jack and Laura Dangermond Preserve	Natural History Museum of Los Angeles County	Dr. Austin Hendy
sUAS surveys for AVIRIS SHIFT campaign	University of California, Santa Barbara	Jordan Snyder
Scaling Hydraulic Traits: SHIFT Campaign Research	University of California, Los Angeles	Elsa Ordway
Assessment of Fairy Shrimp on Dangermond Preserve	TNC	Elizabeth Hiroyasu
DNA Metabarcoding and Isotopic Analysis of Wild Pig (<i>Sus scrofa</i>) Scat to Determine Diet Composition and Movement at the Jack and Laura Dangermond Preserve	TNC	Elizabeth Hiroyasu
Dangermond Environmental DNA and Isotopes: Restoration and Historical Ecology	TNC	Sabrina Shirazi
Inland Roads Restoration Project	TNC	Laura Riege
Cojo Marine Terminal Restoration Project	TNC	Laura Riege
Percos Restoration Project	TNC	Laura Riege
Marine Protected Area boundary mapping	MPA Collaborative Network	Calla Allison
Jalachichi Ponds Restoration Project	TNC	Laura Riege
Ice plant Habitat Enhancement	TNC	Laura Riege
Oaks Mitigation Restoration Project	TNC	Laura Riege

Pacific Off-Shore Bat Activity	USGS	Bethany Schulze
Pismo clam monitoring	Cal-Poly, San Luis Obispo	Benjamin Ruttenberg
Videography-Photography offshore of Point Conception to Cojo Anchorage	NOAA Office of National Marine Sanctuaries West Coast Regional Office	Robert Schwemmer
NASA/TNC/UCNRS AVIRIS Field Campaign	TNC	Mark Reynolds
Historical Ecology of Dangermond Preserve	TNC	Kelly Easterday
Marine to Terrestrial Resource Subsidy Use on the Gaviota Coast	University of California Santa Barbara Department of Ecology, Evolution, and Marine Biology	Hillary Young
Surveys of stream and riparian health	University of California, Santa Barbara	Scott Cooper
Eco-evolutionary dynamics of a contemporary range expansion	Bodega Marine Laboratory	Samuel Walkes