



Photo Credit: Kelly Easterday/TNC

Winter 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 diverse research collaborations, data stewardship and sharing, and innovative technological solutions.

RESEARCH HIGHLIGHTS

PCI has now facilitated over 70 research projects, establishing relationships with principal investigators and research partners from over 20 institutions (see list below). The interest of leading research institutions is 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.

NEW PROJECTS

- Marine resource use by small mammals – Katie Elder, Dr. Tim Bean, Cal Poly SLO
- Prescribed fire planning, implementation, monitoring – Dr. Elizabeth Hiroyasu, Moses Katkowski TNC, UC Berkeley, UCSB, UC Extension
- Seal haul-out camera monitoring – Dr. Chris Lowe, Shark Lab, CSU Long Beach
- Marine to terrestrial ecosystem subsidies on the Gaviota Coast – Dr. Hillary Young and Zoe Zilz UCSB
- Headland bypass dune ecosystems and sand transport analysis – Dr. Ian Walker and Maddison Heffentrager UCSB
- Linking freshwater ecosystems to wildfire risk – new NASA Grant – Dr. Kelly Easterday (TNC), Co-PI's Dr. Mark Reynolds (TNC), Dr. Ben Halpern (NCEAS) and others

SPOTLIGHT: GROUNDWATER RESEARCH

UCSB Bren School Associate Professor Scott Jasechko and colleagues published an important [study in Nature Communications](#) on analysis of thousands of groundwater wells (including wells at Dangermond Preserve). [Their research](#) shows that that modern groundwater is being pulled deeper into heavily pumped aquifer systems potentially endangering deep groundwater quality.

COMING IN 2023: PCI FIELD STATION!

We have been hard at work on renovations and construction of the PCI Field Station at Dangermond Preserve. Thanks to our visionary donors the Zegar Family Foundation, the Zarcades Family Foundation and the Jack and Laura Dangermond Conservation Foundation, PCI will have much needed research facilities and overnight accommodations opening later in 2023.

POINT CONCEPTION INSTITUTE FIELD STATION



#1 Zarcades Family House



#4 Zegar Ranch House



#2 PCI Adobe Office

UPDATE: PROJECT SHIFT – NASA-UCSB-TNC PCI RESEARCH



NASA-UCSB-PCI Project SHIFT Science Meeting – NCEAS Sept 13-14, 2022. Photo Credit: Ginger Gillquist/NCEAS

In September, NASA-JPL led a convening of Project SHIFT (Surface Biology and Geology High Frequency Time Series) at the National Center for Ecological Analysis and Synthesis in Santa Barbara. Over 40 researchers from NASA, UCSB, UCLA, TNC, University of Wisconsin, other institutions participated in the two-day conference.

PCI FELLOWS PROGRAM

We are excited to announce the PCI La Fetra Fellows Program. Thanks to a generous gift from the La Fetra Family Foundation we are establishing a conservation research fellows program for scholars working with PCI. Research fellows play a critical role in facilitating collaborations among diverse institutions and lead the execution of complex research plans to deliver scientific discoveries and findings. Fellows will work at the interface of science and TNC's conservation work at the Dangermond Preserve. We plan to bring on our inaugural PCI La Fetra Fellow in 2023.

COLLABORATIONS

This year, PCI offered summer internships and capstone projects to a select group of graduate student researchers from UCSB Bren School. These students recently completed projects exploring the behaviors of coastal carnivores and identifying conservation priorities along the Gaviota Coast. Additionally, two communications projects were completed by Bren School students focusing on “Discoveries at Dangermond Preserve” and “Carnivores at the Coast.”

CONSERVATION TECHNOLOGY

This year, we continued to expand our Preserve monitoring network by deploying several new technologies. On the operations front we deployed sensors to monitor water tank levels and alert when problems in the system arise, saving two precious resources- water and our own staff time and capacity. We continue to find ways to increase our onsite awareness as well as generate data to help us answer and anticipate key management questions. Recently, this includes the addition of GPS trackers on Preserve vehicles. Gathering information on our vehicle use patterns helps unveil the spatial and temporal use patterns on the Preserve, enabling better decision making and planning. These tools and many others develop a more robust picture of our onsite operations and enable us to better steward the land.

In the research and monitoring arena we installed 14 additional wildlife cameras on the coast including five live streaming networked cameras, giving an instantaneous view of wildlife behavior and dynamics at the coastal-marine nexus. Take a look at [this video](#) for a view into how this type of technology is changing the biosecurity game at Santa Cruz Island, and visit [this website](#) to learn more about the research behind the cameras.

Moving towards our goal of creating a water budget for the Jalama Watershed we increased our number of groundwater sensors in the Jalama Creek watershed to a total of 19- these sensors are giving us a look at groundwater level, temperatures, and in conjunction with data from [nearby weather stations](#) the ability to understand and estimate ground water infiltration rates. This understanding of the water cycle, including critical water transport pathways will be invaluable for predicting species responses to changing precipitation regimes and water availability. This growing instrumentation network is bookended with investment in cloud storage and visualization platforms, and analytical tools that will provide the baseline information needed to springboard even more science and conservation at the Preserve.

If you are ready to submit your research data or want to see published research data from nearby, check out our [Dangermond Preserve Research Repository for Data Discovery \(R2D2\)](#).



(L-R, Sara Beery (CalTech- Google), Nathaniel Rindlaub (TNC), Jinsu Elhance (TNC), Kelly Easterday (TNC) setting up wireless live streaming wildlife cameras)

We are grateful for your support of PCI's mission to harness the power of science and technology for conservation. As the year comes to a close, we can reflect on the progress we've made and the dynamic research community we are building together. While these biannual newsletters are a great way to provide updates, we can't wait to be together again. Please save the date for the inaugural **Dangermond Preserve – Point Conception Institute Spring Science Symposium** hosted by TNC and UCSB Geography **on the UCSB campus, Friday, March 17th**. More details to come in the new year.

Cheers,

Mark

MEDIA AND STORIES

- [Discoveries at the Dangermond Preserve](#)- Story Map developed in partnership with Bren Communications Students
- [A vision for a Wild Coast](#) - A look back in time and to the future in a web experience developed in partnership with San Francisco Estuary Institute
- [Protecting Point Conception](#) – ESRI Blog Post
- [California's Last Perfect Place](#)- NPR's Blue Dot podcast featuring PCI's Mark Reynolds on the amazing Dangermond Preserve.

RECENT PUBLICATIONS AND PRESENTATIONS

Thaw, M., M. GebreEgziabher, J.Y. Villafañe-Pagán, and S. Jasechko, 2022. Modern groundwater reaches deeper depths in heavily pumped aquifer systems. *Nature communications*, 13(1), pp.1-9. <https://doi.org/10.1038/s41467-022-32954-1>

Anderson, B. L. Genua, G. Ives, M. Bowen, O. Liu, T. Paschos, K. Easterday, J. H. Thorne. Tracking Change in Oak Woodland Structure and Extent at the Dangermond Preserve. *Presentation at the University of California Division of Agriculture and Natural Resource's '8th California Oak Symposium' at Cal-Poly SLO Oct 31-Nov 3, 2022.* (TNC was a sponsor of this meeting which also featured a field trip to Dangermond Preserve)

Cope, S., V. Zetterlind, B. Tougher, K. Easterday. Using machine learning to optimize autonomous tracking of vessels by marine radar. 2021 IEEE Oceans

Rick, T., Braje, T., Easterday, K., Graham, L., Hofman, C., Holguin, B., Mychajliw, A., Reeder-Myers, L. and M. D. Reynolds. 2022. Cultural Keystone Places and the Chumash Landscapes of Humqaq, Point Conception, California. *American Antiquity* 87(3), pp. 487–504. doi: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. 2022. Ecological land classification derived from multi-decadal satellite imagery predicts patterns of oak woodland dieback during extreme drought. *Front. For. Glob. Change* 5:867369. doi: 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. Submitted to *Madrone*.

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	National Aeronautics and Space Administration	Dave Schimel
Coastal Carnivore Conservation	University of California, Santa Barbara	Rae Wynn-Grant
Implementation of a real-time acoustic receiver buoy off Government Point to detect tagged white sharks in proximity to new seal rookeries.	Cal 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 in Jalama Creek	University of California, Los Angeles	Maura Palacios Mejia
Gaviota Tarplant Genetic Study	Dudek	Jake Marcon
Surveys for and collection of buckwheat blue butterflies (<i>Euphilotes</i> sp.)	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 fluxes in 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 to evaluate rates and patterns of coastal uplift and fault hazards	Cal State University, Long Beach	Nate Onderdonk
Seabird Movement and Foraging at Dangermond Preserve	The Nature Conservancy	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 Dangermond Preserve preservation and conservation	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

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 (NHMLAC)	Dr. Austin Hendy
sUAS surveys for AVIRIS SHIFT campaign	University of California, Santa Barbara	Jordan Snyder
Scaling Hydraulic Traits : SHIFT Campaign Research	UCLA	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
CCC Inland Roads Restoration Project	TNC	Laura Riege
CCC Cojo Marine Terminal Restoration Project	TNC	Laura Riege
CCC Percos Restoration Project	TNC	Laura Riege
Marine Protected Area boundary mapping	MPA Collaborative Network	Calla Allison
CCC Jalachichi Ponds Restoration Project	TNC	Laura Riege
CCC Iceplant Habitat Enhancement	TNC	Laura Riege
CCC Oaks Mitigation Restoration Project	TNC	Laura Riege

Pacific Off-Shore Bat Activity	USGS	Bethany Schulze
Pismo clam monitoring	Cal-Poly SLO	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	The Nature Conservancy	Mark Reynolds
SFEI Historical Ecology of Dangermond Preserve	The Nature Conservancy	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
Chaparral and shrubland prescribed fire ecology	University of California, Davis	Hannah Etchells
Monitoring of prescribed fire effects on Coast Live Oaks	University of California, Santa Barbara	Ryan Fass
Prescribed Fire Air Quality Effects	Lawrence Livermore National Laboratory	Michael Morrison
Gaviota Tarplant Populations	US Fish and Wildlife Service	Mark Elvin
Ecological Impacts of Prescribed Fire	University of California, Santa Barbara	Shane Dewees
Anthropology of Prescribed Fire	University of California, Santa Barbara	Jordan Thomas
Jalama Creek Watershed Assessment	California Department of Fish and Wildlife	Kyle Evans
Wildlife community resilience to wildfire	UCSB Bren School	Ruth Oliver
Tech-enabled Species Distribution Assessment	Yale University	Walter Jetz