

Point Conception Institute Science Symposium

Science for a Wild Coast

Friday, April 24, 2026



PCI SCIENCE SYMPOSIUM 2026 ATTENDEES © Monie Photography





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Acknowledgements

We are grateful to the Jack and Laura Dangermond Conservation Foundation and the Zegar Family Foundation for their generous co-sponsorship of the fourth annual Point Conception Institute Science Symposium. The Symposium Planning Team (Emily Alonso, Kelly Easterday, Sophia Leiker, Karin Lin, Chelsea Nielsen, Emily McFadden, and Mark Reynolds) worked to design a welcoming PCI

“big tent”. A raucous round of applause to each of the presenters for providing a huge amount of science in relatively short amounts of time. We owe warm thanks to the breakout session facilitators for leading groups in discussions: Kelly Easterday, Norah Eddy, Sophia Leiker, Keith Miller, Laura Riege, and Jono Wilson.

Thank you to each attendee for bringing curiosity, thoughtfulness and a willingness to engage throughout the day. By sharing your ideas and knowledge, you made the symposium more impactful for us all. We hope everyone is inspired by what we envisioned together during the “Wild Coast” discussion.

Gathering in place at the incredible Jack and Laura Dangermond Preserve made what we have built together, tangible—a community filled with hope for our future and energized to seize the momentum of this moment.

The Point Conception Institute

The Point Conception Institute (PCI) is designed to dramatically accelerate how conservation science is generated, shared, and applied in places where ecosystems and communities face rapid change. PCI is working to shorten the feedback loop between scientific research and conservation action. In the past five years, our model integrating place, partners, data, technology, and an adaptive management mindset is transforming research-driven solutions to accelerate practical, scalable conservation action. Centered at the Jack and Laura Dangermond Preserve, the largest and most intact wild coastal area in Southern California, this 24,364-acre landscape is being stewarded by TNC sustainably, with a focus on how to better restore and manage the preserve and to conduct critical science to support these goals. Managing the preserve and its natural resources and leveraging it as a living laboratory for rigorous conservation research is leading to more rapid development and export of science-based conservation strategies to inform our work at the Dangermond Preserve and throughout California.

Science for a Wild Coast

Accounting for less than 5% of Earth’s land area, coastal ecosystems are highly productive, concentrate disproportionately high values for biodiversity and ecosystem services and globally threatened by changing climate, sea level rise, and development. A recent study found that only 15% of the global coast remains intact. California’s nearly 1,000 miles of diverse coastline, ranging from remote, wild, and rugged to some of the most urbanized coast in the world is one of six global coastal biodiversity hotspots. California’s coastal habitats have seen steep declines—as have the species that depend on them. With roughly two-thirds of the state’s population living within 30 miles of the shore, coastal areas are straining against further development pressure on one side and sea level rise on the other. A recent PCI study found that around 35% of the California coast retains “wildness attributes” but that only 9% is characterized as wild and also protected on both land and in the adjacent waters and lagging behind land and ocean protection. With this as deep background, PCI and partners have been leveraging the wild coast of the Dangermond Preserve as a novel area for study. Research results from these studies presented at the ‘Science for a Wild Coast’ symposium and summarized in this report are revealing the complex ecological dynamics of a wild southern California coast and what conservationists need to do to protect and restore coastal wildness here and around the world.

TNC is working to protect California’s wild coast and the communities who love and depend on it. Scientists and conservationists across our programs are deploying cutting-edge science, novel restoration techniques, and creative market and policy approaches to achieve our ambitious

conservation goals. Our work depends on collaborations with local, state, federal, and tribal partners—as well as the support of our local community, dedicated philanthropists and researchers. Together, we are recovering endangered species, creating strongholds where wildlife can adapt to the warming climate and shifting shoreline, and helping communities become more resilient to climate change impacts

Presentation Summaries

Welcome

Dr. Mark Reynolds, The Nature Conservancy

Dr. Reynolds welcomed the group to the symposium, sharing a memory of the first Earth Day, and seeing an image of the Santa Barbara coastline that inspired him to care for and protect the coast of California. Seeing recent images of Earth taken from NASA's Artemis 2 Orion spacecraft, Mark reflected on progress over the past several years, including the protection of the Jack and Laura Dangermond Preserve at Point Conception in 2017, which is a crucible for much of California's astounding biodiversity. Dr. Reynolds then went on to describe the Point Conception Institute, where they are using science to understand an incredible protected area while aiming for collective impact through data sharing and collaboration. The intentional research initiatives are aimed to focus on synergies in research. In its brief five-year history, PCI has advanced an understanding of coasts, groundwater, and remote sensing, published over 20 research papers, created the Geospatial Hub for sharing spatial data, and is working to create a first-of-its-kind digital twin of a conservation landscape with partners at the University of California, Santa Barbara. Acknowledging that this is a very challenging time for science, Dr. Reynolds thanked attendees of the symposium for their critical work in science, noting how important it is to gather as a community to strengthen relationships and collaborative work. He ended by challenging attendees to imagine what the news headline in ten years might be for the "wild coast".

Keynote

Dr. Ben Halpern, National Center for Ecological Analysis & Synthesis, University of California, Santa Barbara | [Slides](#)

Dr. Halpern introduced the concept of accelerating coastal science in the next decade. He set the stage of how he thinks about coasts, and how the Dangermond Preserve allows us to think about linked systems. Like a lesson from Sesame Street, Dr. Halpern's talk was "brought to you by the letter C". Dr. Halpern raised the ideas of "Convene people, Compile data, build Community" in a discussed about how science can lead to action, and notably for critical coastal zones, where over 60% of the world's population resides. Yet coasts are often overlooked by science. The future of PCI can be transformative, by convening people, by building connections and community, by providing context and leveraging place to export learnings, and communicating lessons learned with communities, politicians, and others. Dr. Halpern concluded by thanking TNC and the entire PCI and Dangermond Preserve team for its inclusive approach to research, turning science into conservation action. "Together this place next to "the sea" can help "us see" what the future brings us."

Morning Session: Traces, Tracks, and Trends: Biodiversity Monitoring on the Wild Coast to Inform Conservation Action

Dr. Pete Raimondi, University of California, Santa Cruz; presented by Dr. Walter Heady, The Nature Conservancy

Black Abalone Restoration at Dangermond Preserve: How We Got Here and Where We Are Going | [Slides](#)

In this talk, Dr. Heady presented research led by Dr. Raimondi and collaborators who initiated a black abalone restoration program over the past five years, focused initially at Dangermond Preserve, to guide future efforts throughout the species former range. Black abalone have suffered a number of environmental impacts over the last 40 years, resulting in a massive reduction in population and spatial distribution, this led to its listing as an endangered species in 2009. Dr. Heady shared details about recent efforts to translocate black abalone from TNC's Santa Cruz Island Preserve to Dangermond Preserve. The lessons learned from this work are that black abalone seem to be resilient, can survive after being translocated, and most importantly can reproduce. Dr. Raimondi's historical work led to the way to this recovery effort, and monitoring is ongoing.

Mr. Dan Robinette, Point Blue Conservation Science

The Jack and Laura Dangermond Preserve: Creating a Wild Coast for Migratory and Nesting Marine Birds | [Slides](#)

Mr. Robinette described important long-term studies of birds on the Dangermond Preserve coastline. Because the preserve has geographic features that influence ocean currents and the delivery of ocean subsidies to coastal habitats, its coastal geography, combined with the exclusion of most human activities, creates a living laboratory to explore the benefits of "wild coasts" to a diverse marine bird community and the habitats on which they depend. In a recent study using general linear models (GLMs) to see which factors are impacting where and how many shorebirds we see, Dan found that even with relatively little human use of the coast, there is a case for looking at the impact of human presence on migratory shorebirds. This supports the importance of conserving "wild coasts".

Dr. Walter Heady, The Nature Conservancy

Restoring Land-Sea Connection: Instream Science and Restoration to Recover Southern California Steelhead | [Slides](#)

Dr. Heady discussed how managing 96% of the Jalama Creek watershed offers TNC a unique opportunity for directed actions towards restoration and recovery. TNC is also using the preserve as a living laboratory to advance science and conservation by prioritizing key restoration such as removal of barriers to fish movement, reconnecting land and sea, and enabling anadromous migration, while simultaneously conducting science to quantify ecosystem response and inform habitat suitability for the recovery of Southern California steelhead. Dr. Heady showed before and after photos of the removal of barriers from Jalama creek in 2023 and 2024, and the locations of restoration at 2.9 km and 21.2 km from the coast. The photos show that these disturbance-adapted systems can bounce back. Monitoring water quality shows that the water is suitable for steelhead. Matt Mensinger from UCSC is a PCI Fellow and his research is about the importance of Jalama Creek to the regional recovery of Southern California steelhead. With additional research, it may be possible to include Jalama Creek as a potential site for translocating steelhead from a population at risk due to an event such as a debris flow or flooding.

Mr. Frankie Gerraty, University of California, Santa Cruz

Historical and Potential Future Importance of Marine Megafauna Subsidies to Terrestrial Ecosystems | [Slides](#)

Mr. Gerraty, a former PCI fellow, discussed a global synthesis he conducted in collaboration with NCEAS and UCSB, which revealed the ecological consequences of these subsidies and highlights how recovering megafauna populations may restore coastal ecosystem function and inform conservation strategies. The study included 63 papers, primarily from the western hemisphere, looking at three primary questions: 1) How do marine megafauna influence nutrient flows? 2) What is the delivery of terrestrial consumers? 3) What are the ecological consequences of marine megafauna to the terrestrial ecosystem? Marine megafauna facilitate the transfer of nutrients from marine to terrestrial ecosystems by serving as both food sources for land-based consumers and vectors of marine-derived nutrients, but the abundance of marine megafauna has declined drastically. It is important to build frameworks for how to consider these interactions and connections, and which ones are important to conserve.

Ms. Grace Lewin, University of California, Santa Barbara

Marine Resource Use in Large Coastal Mammals: Implications for Connectivity and Management | [Slides](#)

Large terrestrial mammals along the Central California coast, including coyote, bobcat, mule deer, and wild boar, are frequently observed along the shores of the Jack and Laura Dangermond Preserve. Grace Lewin engaged a team of conservation dogs, who were trained with scat from Dangermond Preserve. Wearing goggles, Barley the scat dog went to work searching for scat. The study focused on coyote diets, and looking at spatial structure using distance to coastline, indicated that there was equal probability of finding marine prey in scat close to and far from the coast (no decrease in marine resource detection up to almost 5km from the coast), highlighting the importance of maintaining inland-to-coast wildlife pathways to preserve ecosystem connectivity.

Ms. Jennifer McCool, Santa Ynez Chumash Community Member

Land Acknowledgement

Jennifer McCool welcomed attendees to the land on behalf of her Samala Chumash culture and connections. Growing up, Jennifer had a close relationship with the ocean, and because of her culture, learned about the medicines that the land offers. She sees herself as a healer and as a paddler. She raised her children in the Santa Ynez Valley and today, Jennifer celebrates her living culture by volunteering at the Santa Ynez Chumash Museum and Cultural Center. She reminded attendees that the Indigenous peoples are a missing link in the conservation science realm. She wants to learn how to analyze data using an Indigenous perspective, and shared that we need to be thankful to the land that gives us information. She urged to all, "Every time you collect data, say thank you." Two years ago, Jennifer first came to the Dangermond Preserve with the Santa Ynez Chumash Environmental Office. She appreciates how TNC encourages her to have a relationship with this land and thanked all the species of this place.

Dr. Jenny Dugan, University of California, Santa Barbara

A Fisheye View of The Surf Zone on A Wild Coast: Surfperch at The Jack and Laura Dangermond Preserve | [Slides](#)

Dr. Dugan summarized her work on surfperch at the Dangermond Preserve. At the edge of land and sea, sandy beaches and surf zones are part of many of California's network of 124 Marine Protected Areas (MPAs). In the Point Conception MPA State Marine Reserve (SMR) there are 3.7 miles of coastline, and within the Dangermond Preserve there is a fully protected wild coast for surf zone fish and an outstanding study site for surfperch. Dr. Dugan found that Dangermond Preserve is a hotspot

for surfperch diversity, with peak population metrics for barred surfperch, and high reproductive capacity. These provide strong signals for marine protected areas.

Ms. Tiffany Whitsitt-Odell, Department of the Air Force, Vandenberg Space Force Base
Vandenberg SFB Wild Coast: Ongoing Habitat Restoration for Special Status Species | [Slides](#)

Ms. Whitsitt-Odell's talk described current and future habitat restoration for multiple special status species across Vandenberg SFB. The area is 120,000 acres and includes 42 miles of coastline and 14 federally listed species. The restoration projects have multi-species benefits, and focused on riparian (i.e., San Antonio Creek soil restoration to provide habitat for California red-legged frog and Southwestern pond turtle) and dune ecosystems (e.g., for Western snowy plover and El Segundo blue butterfly). She described work to convert non-native ice plant to coastal scrub, using a method of leaving ice plant in place, punching into the thatch, and planting native species with volunteers. After five years, the ice plant left in place helped with erosion, while the coastal scrub is thriving. Because the DAF owns Point Conception the restoration in place is planned in coordination with TNC and will use lessons learned from the work at Vandenberg SFB.

Dr. Robert Miller, University of California, Santa Barbara

Santa Barbara Coastal Long Term Ecological Research (National Science Foundation) | [Slides](#)

The Long-Term Ecological Research Network was founded in 1980 through National Science Foundation. Across 27 sites, including the Santa Barbara Coastal LTER, principal investigators, undergraduate and graduate students conduct studies in four categories: 1) Coordinated long term measurements; 2) Shorter term measurement intensive process studies; 3) Manipulative experiments; and 4) Synthesis through modeling and integrated analyses. At the Santa Barbara LTER site, Dr. Miller and others have been conducting research on coastal kelp forests and their connection to the land and ocean. Described as a foundational species, giant bull kelp plays an outsized role in the ecosystem, and researchers wanted to understand—why is it a foundational species? Kelp stabilizes environment and ecosystem processes, provides structural habitat through shade, and provides food.

Afternoon Session: Wired for Wildlife: How Technology Is Transforming Biodiversity Monitoring

Dr. Morgan Gray, Pisaster

From Cameras to Baseline: Monitoring Coastal Mammals at Dangermond Preserve | [Slides](#)

Dr. Gray presented findings from a four-year wildlife camera assessment along the coastline of Dangermond Preserve. Using seasonal data from 24 traditional and wireless cameras, this study established a quantitative baseline for how the preserve's terrestrial mammal community uses the coastal zone. Dr. Gray noted that although it can be tedious, the validation of images is important, as it can change the story told with data. In addition, occupancy is a useful way to understand presence as species presence can often be undercounted. A standardized design produces better land-use estimates. Overall, monitoring design and data validation shape the reliability of biodiversity estimates, with implications for coastal wildlife conservation.

Ms. Bethany Schulze, U.S. Geological Survey

Bats By The Sea: Activity and Seasonality at The Dangermond Preserve, Across the California Coast, and Throughout the Offshore Environment | [Slides](#)

Insectivorous bats are active year-round in coastal California, but their populations are threatened by wind turbines. Ms. Schulze described a study on hoary bats, a long-distance migratory species that is susceptible to offshore wind turbines as they migrate over the ocean. Using acoustic bat detectors that collected data which was analyzed through 2024, research showed that depending on the species of focus, seasonal activity can vary. At Government Point in the Dangermond

Preserve, a lot of species are active in the late summer and fall, while data showed that hoary bats can be detected at almost any time of year along the coast. Long-term acoustic monitoring data such as this can be used to inform offshore wind development and plan around seasonal and regional effects along the coast.

Dr. Trisalyn Nelson and Dr. Amy Frazier, University of California, Santa Barbara

A Digital Twin for Conservation: Leading Scientific Discovery and Decision Support | [Slides](#)

Dr. Nelson and Dr. Frazier discussed the Spatial Center at UCSB collaboration with TNC, PCI, and Esri to create a digital twin of the Dangermond Preserve, which is a working model of the protected area, updated in near real-time by a vast network of sensors strategically positioned across land and water. They shared the current version of the platform and requested feedback on what functionality they could develop in the future to allow research of additional aspects of the preserve. They announced that Dr. Frazier and Will Overbye-Thompson would be demonstrating the current version at the reception in the evening and welcomed attendees to learn more.

Dr. Kelly Easterday and Ms. Sophia Leiker, The Nature Conservancy

From Digital Twin to Wild Coast Index: Measuring Coastal Wildness | [Slides](#)

Dr. Easterday discussed the sensors, remote sensing, and ecological data being used to support science-based decision-making at the Dangermond Preserve in the Geospatial Hub. Ms. Leiker described that by using a conservation focused digital twin, TNC is seeking to understand what “wild” means and compared to what, and what datasets are needed for measuring coastal wildness? TNC is asking: What attributes help us define coastal wildness? Where are there areas of wild coastline with land-sea protection? How can we use a “Wild Coast Index” to inform coastal conservation decisions? Ms. Leiker is working to develop an index that identifies patterns of coastal wildness, protection gaps, and conservation priorities. The attributes used in the index were: 1) human disturbance; 2) ecological intactness; 3) habitat and species diversity; and 4) physical intactness. She noted that the scale is important to keep in mind when using an index, and what is relevant at the scale of the Dangermond Preserve may be different at the scale of California’s coast as well as for coasts around the world.

Breakout Group Discussions

In the afternoon, breakout discussions took the attendees out of the tent and into the Camilla Chandler Research Laboratory Wild Coast Lab and Cojo Lab, and the Adobe Office.

Breakout 1: Science for a Wild Coast: Research Gaps and Opportunities

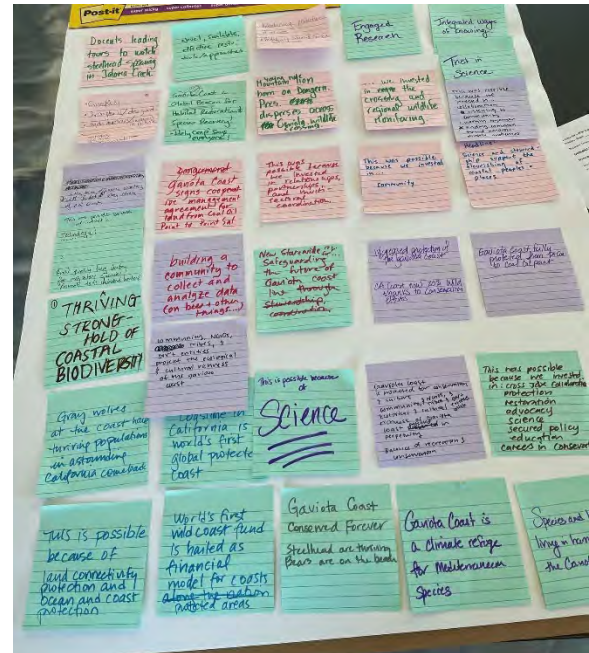
The objective of Breakout 1 included a visioning exercise for the Gaviota Coast where individual participants were invited to imagine a headline about the coast in 2026. Participants shared these headlines by sticking their notes on flip chart sheets and then selected three headlines that resonated the most with them. Then participants divided into small groups to identify research priorities, and then to categorize and prioritize them. The three groups were facilitated by Kelly Easterday, Laura Riege, and Jono Wilson. See Appendix 2 for notes and a synthesis of the breakout sessions.

Synthesis¹

The purpose of the science session was to define what success looks like for conservation on the Gaviota Coast and identify the science, data, and partnerships needed to achieve it. Participants were asked to envision long-term outcomes (e.g., 10+ years), surface key research questions and

¹ Synthesis of each breakout group was drafted with support from Microsoft CoPilot

- Long-Term, Science-Driven Conservation
 - Success depends on sustained scientific investment, not short-term studies. Continuous monitoring, experimentation, and long-term datasets are essential to demonstrate outcomes, track recovery, and understand ecological change. This depth of evidence enables more adaptive management and better decision-making at scale. Strategic monitoring—grounded in regional protocols and clear indicators such as species recovery, ecosystem function, and connectivity—is critical for measuring progress and aligning efforts across partners.
- Data, Modeling, and Prediction
 - Success is not just collecting data but using it to predict and act. Tools like digital twins, remote sensing, and modeling enable forecasting, scenario testing, and more informed decision-making.
- Collaboration and Openness
 - Impact depends on strong collaboration and shared systems. Open data, shared learning (including failures), and cross-sector partnerships reduce duplication and enable coordinated action at scale.
- People as Part of the System
 - Lasting conservation integrates people and place. Inclusive, place-based stewardship—grounded in Indigenous participation, community connection, and trust—is essential, alongside a balanced approach to access that maintains the integrity of wild systems.



Indicators of Success (What We Measure or Observe)

Ecological Indicators (Most repeated)

- Species recovery and persistence, particularly for historically threatened or endangered species (e.g., steelhead return, abalone and rocky intertidal recovery).
- Biodiversity and ecological integrity, reflected in diverse, abundant, and functionally intact ecosystems.
- Ecosystem function and resilience, reflected in intact landscapes, functional hydrology, and demonstrated resistance or recovery from climate stressors such as drought.
- Quantified connectivity across land and sea, observed through wildlife movement, population viability, and continuity of natural processes from watersheds to nearshore systems.
- Habitat condition and reduced pressures, including limited fragmentation, healthy system structure, and reduced invasive species impacts.

Scientific and Monitoring Indicators

- Strategic long-term, continuous monitoring, with data collected at sufficient frequency and resolution to detect trends over time rather than single snapshots and grounded in regional protocol appropriate to place.

- Defined bioindicators and shared metrics of success, such as key species, ecosystem functions, and connectivity measures used consistently to track progress and align efforts across partners.
- Ability to measure and quantify change, including population health, reproduction, habitat suitability, and ecosystem function.
- Decision-relevant modeling capacity, including the use of tools such as digital twins to support prediction, scenario comparison, and adaptive management.
- Active integration and use of shared data, where data is not only open and accessible, but applied across partners to inform coordinated decision-making and management.

Social and Collaborative Indicators

- Durable cross-sector partnerships across agencies, organizations, tribes, and landowners.
- Shared goals and aligned priorities, reflected in coordinated action, reduced duplication of effort, and a functioning coalition working toward a common vision.
- Open and accessible data practices, supporting transparency, trust, and shared learning.
- Community connection and shared understanding, especially where protection limits access but conservation values remain widely supported; storytelling and transparent science help build a bridge to broader audiences.
- Inclusive, place-based engagement, including meaningful Indigenous participation and the incorporation of multiple ways of knowing in stewardship and decision-making
- Benefits of wild places to people, including cultural value, inspiration, and resilience—recognized as important but harder to measure.

Action Items

Near-Term Action Items (1-2 Years: “What We’d Regret Not Doing Now”)

- Expand and standardize strategic monitoring systems, particularly high-resolution drone flights and continuous data streams needed to detect near-term change. Establish regional protocols for comparability and secure sustained funding to support long-term implementation.
- Invest in high resolution data collection and predictive modeling tools, including expanding digital twin capabilities and integrating modeling outputs into management and decision-making processes.
- Advance open data and open access practices, ensuring datasets are usable, well-maintained, interoperable and actively shared across partners.
- Clarify indicators of success, identifying a short list of biotic indicators and system-level metrics that can be consistently tracked in the near term.
- Strengthen coordination among existing partners, reducing redundant effort and aligning around shared research questions, goals, and common set of indicators and metrics.
- Advance targeted species recovery efforts, including expanding translocation, habitat restoration and invasive species management, with a focus on demonstrating measurable ecological outcomes.
- Deepen inclusive engagement and communications, engage Indigenous communities and local stakeholders early and meaningfully. Build a shared vision and trust across communities. Communicate early wins and lessons learned through science-based storytelling to build momentum and broader support.

Priority Research Questions and Knowledge Gaps (Longer-Term)

- How do rewilded coastal systems function over decades, and which processes most strongly drive resilience under climate change?

- Which connectivity pathways most strongly influence species recovery, population viability, and ecosystem resilience across land-sea systems, and how can they be measured consistently?
- What ecological relationships and cross-scale interactions (e.g., marine-terrestrial linkages) can be revealed through long-term monitoring and integrated modeling?
- Which species, functional groups, or system-level indicators best quantify ecosystem condition and change, and how can a shared, standardized metric framework be developed and applied across partners? Initial results from the Biodiversity Metrics session point to convergence around habitat, species persistence, connectivity, and ecosystem function as core indicators.
- How do human benefits from wild places manifest, and how can they be responsibly measured without undermining conservation goals?
- What governance, funding, and partnership models best sustain long-term monitoring, data systems, and landscape-scale conservation?
- Where are the most critical data gaps—including socio-economic science, Indigenous knowledge, and under-monitored ecological processes—and what monitoring and modeling approaches are needed to address them?

Breakout 2: Wired for Wildlife: How Technology Is Transforming Biodiversity Monitoring

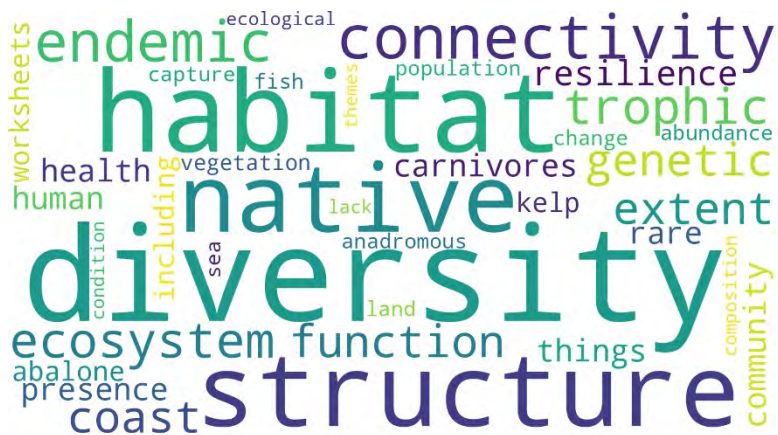
The objective of Breakout 2 was to determine what a successful biodiversity component of a Wild Coast Index look like for the Gaviota Coast. Participants were challenged to imagine being tasked by Santa Barbara County to develop the biodiversity component of a Wild Coast Index, and to decide: What metrics do we include? What technology can we deploy? The three groups were facilitated by Norah Eddy, Sophia Leiker, and Keith Miller.

Synthesis²

This breakout session focused on identifying priority biodiversity indicators to inform a future *Wild Coast Biodiversity Index*. Participants discussed what aspects of coastal biodiversity are most meaningful to measure and what indicators are feasible to track and update over time.

Big Picture Takeaways

- Habitat extent, connectivity, species persistence, and ecosystem function were repeatedly emphasized as foundational to a coastal biodiversity assessment.
- Participants viewed habitat metrics as particularly valuable because they can be measured consistently over time and serve as a proxy for multiple biodiversity processes at once.



² Synthesis of each breakout group was drafted with support from Microsoft CoPilot

- Participants favored indicators that integrate ecological processes and reflect change over time, rather than one-off snapshots.
- Groups explicitly discussed tradeoffs between ideal indicators and feasible, scalable metrics (ex. in field sampling vs satellite based).

Priority Biodiversity Indicators Identified Across Groups

1. Habitat extent, diversity, and condition (Top Indicator Chosen)

- Indicators describing the amount, variety, intactness, and condition of habitats, including how they change over time. This indicator emerged as the strongest point of agreement across groups.
- Example habitats/processes mentioned: kelp forests, coastal sage scrub, oak woodlands, serpentine soils, coastal sage scrub, riparian corridors, wrack abundance, rate of change.

2. Species richness, presence, and population metrics

- Indicators based on how many species are present, their abundance, and population trends over time. Groups consistently identified species-based indicators as important but tended to frame them as trend-based and representative, rather than exhaustive species lists.
- Example species/groups mentioned: anadromous fish (e.g., steelhead), abalone (including black abalone), sea stars, raptors, invertebrates and insects.

3. Connectivity across land-sea and watershed systems

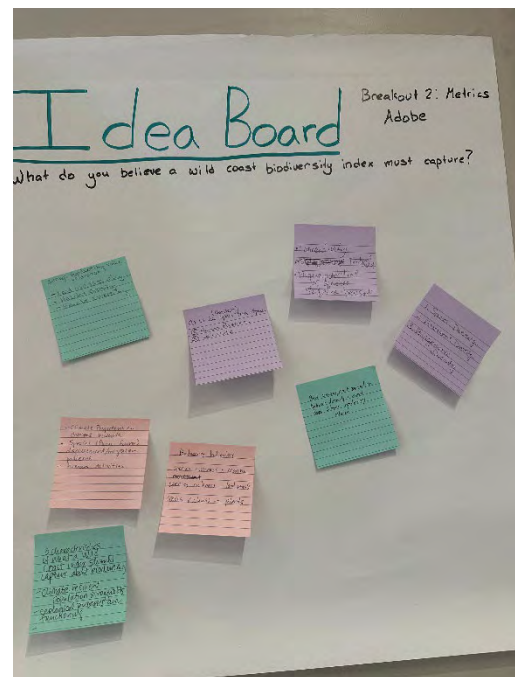
- Indicators capturing movement of organisms, nutrients, and energy across connected systems, as well as fragmentation and barriers. Participants repeatedly stressed that coastal biodiversity cannot be understood in isolation by system or boundary.
- Example processes mentioned: land-sea connectivity, hillslope-beach-nearshore linkages, watershed-estuary-nearshore flow, anthropogenic impacts (sound, light, development), wildlife movement across corridors by mesocarnivores, measurements of impedance.

4. Ecosystem function and trophic structure

- Indicators reflecting food-web dynamics, functional roles, and ecosystem functioning rather than single species alone. Ecosystem function was repeatedly framed as a way to integrate multiple variables into a smaller number of meaningful signals.
- Example indicator species/groups mentioned: raptors, blue whales (as indicators of prey availability and ocean productivity), upland carnivores, anadromous fish, horny toads, roadrunners, water quality.

5. Native, endemic, and rare biodiversity

- Indicators focused on the presence, condition, and distribution of native, endemic, and threatened species. This indicator remained important across groups but was often discussed with an emphasis on assemblages and patterns, rather than individual rare species alone.
- Example species/groups mentioned: # of rare and endemic assemblages, native bees, purple needlegrass, kelp, artemisia, threatened and endangered species.



6. Climate resilience, refugia, and disturbance sensitivity

- Indicators describing the capacity of systems to persist under changing conditions and recover from disturbance. Climate resilience indicators were chosen because participants wanted the index to say something about future persistence, not only current condition.
- Example concepts/species mentioned: refugia presence and connectedness, sensitivity to disturbance and stress, shoreline stability, erosion rates, species indicators – native bees, abalone, sea stars, rockweed, anadromous fish

7. Genetic diversity and population structure

- Indicators addressing genetic variation, adaptability, and long-term population viability. Genetic indicators were viewed as high value but feasibility-dependent.
- Example applications mentioned: genomic indicators, subpopulation structure, genetic diversity of key or wide-ranging species.

8. Culturally and socially valued biodiversity

- Indicators capturing species and habitats of cultural or social importance that reflect place-based meaning and human connections to coastal ecosystem.
- Example species mentioned: Coastal sage scrub, abalone, whales

Shared Views of Design Principles of Biodiversity Indicators

Across discussions, participants emphasized that effective indicators should:

- Capture change over time, not just current conditions
- Reflect functional and ecological processes, not only species counts
- Work across multiple spatial scales (local, regional, and cross-boundary)
- Balance ecological rigor with feasibility and repeatability

Open Questions and Next Steps

Groups identified several areas for further consideration, including:

- How to balance ideal indicators with data availability and monitoring capacity
- How to select indicators that are sensitive to change while remaining stable, repeatable, and defensible over a 3–5-year update cycle
- When genetic indicators add unique value versus when proxy indicators may suffice
- Inputs from this breakout will be used to refine and prioritize candidate biodiversity indicators, alongside considerations of scalability, defensibility, and update frequency.

Closing

Dr. Amy Frazier, University of California, Santa Barbara

Dr. Frazier concluded the day's symposium by thanking the presenters and asking the participants to continue to work on connections amongst each other after the gathering. She used concepts from ecology, such as the barriers removed from Jalama Creek, and she challenged participants to work with each other to remove barriers to collaborative work. Another concept she referenced was that of species translocations or rewilding, such as the successful work on black abalone. She urged participants to think about how they each could translocate, or move, individual knowledge and perspectives into different disciplines to advance science. Finally, she ended by bringing up the concept of different ways of knowing, and how we need to braid together traditional ecological

knowledge with Western science. She ended with a challenge to keep the conversations going from the symposium and turn these discussions into future results to ripple outwards our collective understanding of the Wild Coast. Dr. Frazier asked how we each can keep the community going beyond today towards our shared vision.

Concluding Comments

With 70 attendees representing the scientific community of the Point Conception Institute and the Jack and Laura Dangermond Preserve, this year's PCI Science Symposium provided a "big tent" for sharing pertinent research, represented a diverse array of institutional collaborators, and showcased emerging topics for future work.

Throughout the day, connections were strengthened through group and individual conversations, and new connections were established. In the two discussion sessions, groups were provided with discussion prompts, and shared visions for the future of the "wild coast" and worked together to prioritize biodiversity monitoring in an exercise that showed how complex conservation science decision-making can be. By sharing resources and identifying solutions, PCI's wider community is taking advantage of the astounding "living laboratory" at the Dangermond Preserve.

Our sincere gratitude once again to our co-sponsors, the Jack and Laura Dangermond Conservation Foundation and the Zegar Family Foundation for supporting this incredible scientific community.

Please find additional photos of the symposium [here](#) and visit TNC's [Point Conception Institute at Dangermond Preserve](#) website to learn more.

Appendix I: Program

Point Conception Institute at the Jack and Laura Dangermond Preserve Friday, April 24, 2026

Time	Activity/Topic	Presenter
8:30 AM Patio	Arrivals & Check In (Coffee / tea, fruit, muffins and pastries available)	
9 - 9:15 AM Tent	Welcome and Opening Remarks	Mark Reynolds, TNC
9:15 - 9:45 AM Tent	Keynote Presentation	Ben Halpern, NCEAS / UCSB
9:45 - 9:50 AM Tent	Introduction to Presentations	Mark Reynolds, TNC

Session 1: Traces, Tracks, and Trends: Biodiversity Monitoring on the Wild Coast to inform Conservation Action		
9:50 - 10:05 AM Tent	<i>Black Abalone Restoration at Dangermond Preserve: How We Got Here and Where We Are Going</i>	Pete Raimondi, UCSC
10:05 - 10:20 AM Tent	<i>The Jack and Laura Dangermond Preserve: Creating a Wild Coast for Migratory and Nesting Marine Birds</i>	Dan Robinette, Point Blue
10:20 - 10:35 AM Tent	<i>Restoring land-sea connection: Instream science and restoration to recover Southern California steelhead</i>	Walter Heady, TNC
10:35 - 10:50 AM Tent	<i>Historical and Potential Future Importance of Marine Megafauna Subsidies to Terrestrial Ecosystems</i>	Frankie Gerraty, UCSC
10:50 - 10:55 AM Tent	<i>Marine Resource Use in Large Coastal Mammals: Implications for Connectivity and Management</i>	Grace Lewin, UCSB
10:55 - 11:05 AM	Break	

11:05 - 11:20 AM Tent	<i>A fish eye view of the surf zone on a wild coast: surfperch at the Jack and Laura Dangermond Preserve</i>	Jenny Dugan, UCSB
11:20 - 11:35 AM Tent	<i>Vandenberg SFB Wild Coast: Ongoing Habitat Restoration for Special Status Species</i>	Tiffany Whitsitt-Odell, VSFB
11:35 - 11:50 AM Tent	<i>Santa Barbara Coastal Ecological Research</i>	Bob Miller, UCSB
11:50 AM - 12:05 PM Tent	Community Exercise: What Do We Care About (Greater Gaviota Coast Ecosystem)	
12:05 - 12:10 PM Tent	Session Close and Announcements	
12:10 - 1 PM Patio	Lunch and Group Photo	

Session 2: Wired for Wildlife: How Technology Is Transforming Biodiversity Monitoring		
1 -1:10 PM Tent	Welcome Back and Introducing Session 2	Mark Reynolds, TNC
1:10 - 1:25 PM Tent	<i>From cameras to baseline: Monitoring coastal mammals at Dangermond Preserve</i>	Morgan Gray, Pisaster
1:25 - 1:30 PM Tent	<i>Bats by the sea - activity and seasonality at the Dangermond Preserve, across the California coast, and throughout the offshore environment</i>	Bethany Schulze, USGS
1:30 - 1:35 PM Tent	<i>A Digital Twin for Conservation: Leading Scientific Discovery and Decision Support"</i>	Trisalyn Nelson and Amy Frazier, UCSB
1:35 - 1:50 PM Tent	<i>From Digital Twin to Wild Coast Index: Measuring Coastal Wildness</i>	Kelly Easterday and Sophia Leiker, TNC
1:50 PM - 2 PM Tent	Presentation Close and Announcements Shift to Breakouts	Kelly Easterday

2 - 2:10 PM	Break	
2:10 - 2:55 PM Cojo Lab Wild Coast Lab Adobe Office	Breakout 1 (Science)	Facilitators: Jono Wilson Kelly Easterday Laura Riege
2:55 - 3:15 PM Tent	Reconvene and Share	Kelly Easterday, TNC
3:15 - 3:25 PM	Transition	
3:25 - 4:10 PM Cojo Lab Wild Coast Lab Adobe Office	Breakout 2 (Metrics)	Facilitators: Norah Eddy Sophia Leiker Keith Miller
4:10 - 4:30 PM Tent	Reconvene and Share	Kelly Easterday, TNC
4:30 - 4:45 PM Tent	Bringing it All Together	Amy Frazier, UCSB
4:45 - 5 PM Tent	Closing	Mark Reynolds, TNC

Reception	
5 - 6:30 PM Patio	For those interested, our event photographer will be available during the reception to take professional headshots.