- THE NATURE CONSERVANCY -

THE JACK AND LAURA DANGERMOND PRESERVE ANNUAL REPORT

November 2020



YEAR IN REVIEW

This past year has been a pivotal period of growth for The Nature Conservancy (TNC) at the Jack and Laura Dangermond Preserve. In it, we established detailed management plans for the next five years, embarked on several major restoration projects, and aligned our team behind a strategic vision for the future. The preserve also welcomed a new deputy director, Bill Leahy, whose leadership is proving invaluable as we put in place new programming and establish essential infrastructure.

Now in the final year of the preserve's startup phase, we have a strong foundation of research, staffing, and partnerships as we pursue our ambitious vision for the Dangermond Preserve. Your investment has helped us seize an unprecedented opportunity to push forward the science of conservation and accelerate the quest for solutions to the climate crisis. Together, we are founding a center for research and education that will foster the next generation of environmental leaders and spark the breakthroughs that will help our society adapt to a fast-changing climate.



CREATING A GLOBAL HUB FOR CONSERVATION

One of our core goals at TNC is to create local solutions that can be replicated to solve environmental issues at a global scale. This focus has been central to our planning at the Dangermond Preserve, which is located within a region that has been identified as one of the world's hot spots for extreme warming. This makes the preserve an ideal place to study the impacts of climate change, particularly as Point Conception is at the furthest edge of numerous species' ranges and will be an important corridor through which species pass as they are forced to relocate in response to habitat loss in the years ahead.

We are also in the midst of a global extinction event that continues to accelerate. As it does, the Dangermond Preserve's unique geography and status as one of California's few remaining coastal wildernesses will help us gain insights about the changes taking place. This landscape will serve as a platform upon which we can use this information to experiment with conservation projects that will help species and ecosystems adapt. The preserve's proximity to several major research institutions and one of the largest metropolitan areas in the country enables TNC to do this work in collaboration with leading experts from around the world, while the digital infrastructure we are building will help us share data and collaborate on an even broader global scale.



© TNC | Cartography by Megan Webb

ADVANCING CONSERVATION SCIENCE

Since our last report in the fall of 2019, we have made tremendous progress laying a foundation for the Dangermond Preserve to become one of the world's foremost hubs for collaborative conservation science. The level of enthusiasm from the scientific community has far exceeded our expectations, and we are excited by the outpouring of support and requests to collaborate.

We have secured partnerships with NASA, ESRI, Smithsonian Institution, local bands of Chumash, U.S. Geological Survey, Point Blue Conservation Science, and the California Department of Fish and Wildlife—to name just a few—allowing us to leverage satellite technology, big data analytics, and a range of interdisciplinary expertise that has vastly expanded our capacity for research and discovery.

SENSORS AND INSTRUMENTATION

One of the primary ways we are fueling collaborative science at the preserve is through the installation of sensors and instrumentation across the landscape that will collect real-time data on everything from weather to groundwater quality to wildlife movement. This year, we launched projects to establish weather stations, set up wildlife cameras, anchor buoys offshore, install stream gauges, and implant groundwater sensors in eight wells, all of which will be used to generate real-time data streams that will be integrated together into an online dashboard accessible to researchers. We are also developing novel ways to analyze the data we collect, and recently partnered with Microsoft, for example, to process 400,000 wildlife camera images to study biodiversity across the preserve.

Once we have this data-collection network fully up and running, it will be one of the largest and most comprehensive of its kind, giving researchers an important window through which to monitor how climate change is impacting the California coast. It will also be a powerful tool for accelerating global conservation, as demonstrated by a major project we recently began collaborating with NASA to complete, in which they are using satellites to study changes in biodiversity. We will use data from our groundbased sensors to help calibrate the data they gather by satellite, and we will also be working with them to determine how their research can be used to bolster conservation efforts around the world.



Kelly Easterday

Lead Conservation Technology Manager, Dangermond Preserve

"The technology we're installing here at the preserve will vastly improve our knowledge of how climate change is reshaping the region."



© Melissa Thaw/UCSB | To gather water-quality data, TNC is installing instrumentation throughout Jalama Creek watershed. The photo (right) is an example of a multiparameter sonde installation, while the diagram (left) shows our plan for installing a sonde beside a concrete culvert supporting Jalama Road. The culvert cuts off access to potential steelhead habitat, and collecting data here will help us measure the impact of removing it as a step toward restoring the creek's natural watercourse.

© Torben Rick | Ancient Chumash arrowhead uncovered during an archeological survey at the prese

IT INFRASTRUCTURE

We continue to make rapid progress establishing our communications infrastructure, which is essential for data collection, a valuable resource for visiting researchers, and a tremendous help with the day-today operation of the preserve. This year we installed a telecommunications dish on Santa Ynez peak; brought in a mobile telecommunications trailer; and established internet connectivity with speeds of 200 megabits per second, enough to support a fast connection for up to five users at once and simultaneous data transfer, including live-stream video from a recently installed <u>ALERTWIDII fe</u> camera.

We also debuted a suite of online resources that will enhance our ability to collaborate and welcome researchers to the preserve. These include:

- An online portal through which researchers can apply for opportunities to conduct projects at the preserve.
- A data repository where TNC and our partners will store research findings from all projects that take place at Dangermond Preserve, putting a tremendous amount of data in a single location that is open and accessible to researchers.
- A <u>public-facing website</u> through which people can learn about the preserve and access this growing suite of online resources.







RECENT DISCOVERIES

Though the preserve's programming and research are just beginning to take shape, TNC and our many partners have already embarked on 60 research projects. The results to date are a testament to both the vibrancy of the ecosystems here and also the lack of scientific knowledge that exists about the area around Point Conception.

Some of our most exciting findings to date have come through our partnership with Smithsonian Institution, with whom we have worked on a series of archeological surveys that are part of our effort to study the cultural history of the Chumash peoples in the Point Conception region. By understanding how the Chumash used natural resources, managed the land, and adapted to historic environmental changes-including decades of prolonged drought during the Medieval Warm Period (c. 950-1250)we are gaining insights that will inform our current efforts to adapt to climate change. This work has produced several important findings, including evidence of barracuda and mussel harvests, which gives us information about offshore conditions thousands of years ago. We have also learned that Chumash habitation in the Point Conception region goes back 8,500 years, which is about 1,500 years longer than was previously known.

FOSTERING ENVIRONMENTAL LEADERSHIP

Another central aspect of our mission at the Dangermond Preserve is to inspire and support the next generation of environmental leaders. Thus far, we have piloted an environmental education program for elementary-through-high-school students, formed partnerships with universities whose students are contributing to work on the preserve, and begun collaborating with neighboring communities to develop learning opportunities for local youth.

In May 2020, we were fortunate to have Leslie Chan join our team as the preserve's new visitation manager. As she leads us in expanding our educational offerings and establishing plans for future programing, our goal is to create numerous pathways for a diverse cohort of students, particularly those from underserved communities, and thereby support young people as they move from elementary through graduate school. By offering mentorships, scholarships, fellowships, and research opportunities, we hope to uplift students who may choose to become leaders in fields including public policy, science, advocacy, landscape ecology, and more.

ENVIRONMENTAL EDUCATION PROGRAM

Last year, we hosted students in collaboration with three environmental nonprofits: NatureBridge, NatureTrack, and REACH. Because the COVID-19 outbreak has forced us to pause in-person visitation this year, we are now working with NatureBridge to develop three programs that will provide opportunities for students in the nearby community of Lompoc. The programs include distance-learning curriculum to expand our reach in local schools; targeted engagement with families whom we would host through safe, in-person experiences;



and a leadership-development program in which we will empower high school students to study and address environmental challenges.

UNIVERSITY PARTNERSHIPS

Through partnerships with Cal Poly Pomona's College of Environmental Design and UC Santa Barbara's Bren School of Environmental Science & Management, students from nearby universities made two significant contributions to the Dangermond Preserve this year. Sixteen undergraduate students from Cal Poly began a two-year project of developing a master plan for the preserve's visitation infrastructure. Balancing the necessity of ecological and cultural sensitivity with our needs for technologically advanced facilities, the students developed initial concepts for gathering places, parking, group staging areas, signage, and trail systems that will support our research field station, managed public visitation, and environmental education program. These concepts are serving as the foundation for a capstone design project for Cal Poly undergraduate and graduate students in the 2021 school year.

We were also fortunate to partner with a talented group of five graduate students from UC Santa Barbara, who developed an app to reduce the environmental impact of visitation at the preserve. The students found that all our trails pass through areas of sensitive habitat, but that the potential impacts on these areas change depending on the time of year, weather, size of the group, and activities they are engaged in. The app assesses these factors and assigns each group an ecological impact score, enabling us to ensure they use the route that will cause the least disruption. This innovative tool will not only improve visitation at Dangermond Preserve but could also serve as a framework for developing similar apps to help manage other protected lands.

RESTORING FOR RESILIENCE

Across the Dangermond Preserve, TNC and our partners launched some of the largest coastal restorations ever undertaken in California. These projects are protecting sensitive species and restoring ecosystem functions that will help plants and animals adapt to changing conditions. More importantly, they are designed to have impacts that extend well beyond the Point Conception region, causing positive ripple effects throughout the state and demonstrating models for similar projects that can be conducted elsewhere.





COAST LIVE OAK RESTORATION

Working with volunteers from UC Santa Barbara and other nearby communities, as well as with local contractors, we made great progress on an oak restoration project that covers 150 acres and involved planting nearly 6,000 oak trees, saplings, and acorns. We are now monitoring our plantings with the <u>ESRI</u> <u>oaks dashboard</u> and researching methods we can use to help stimulate natural oak propagation.

The dashboard compiles data from satellite imagery, drone footage, and ground sensors, providing an online platform for the public to view our progress and a powerful tool for TNC's program manager, Laura Riege, who has been using the dashboard amid



THE JACK AND LAURA DANGERMOND PRESERVE

pandemic restrictions to monitor the site and give direction to contractors working in the field.

ICE PLANT REMOVAL

Ice plant is an invasive species that outcompetes native plants, changes soil characteristics, and converts rare headland sand dune habitat into thick mats of vegetation. While ice plant is a problem in many parts of the state, it is particularly damaging at Point Conception, as it interferes with the natural flow of sand over the headland bluffs. With its native dune ecology intact, Point Conception is a crucial land feature on the state's coastline, where sand is blown over the bluffs and into the ocean before being carried down the coast to replenish beaches in Southern California. But with hundreds of acres of ice plant now smothering the dunes, this sand becomes trapped. The result is increased coastal erosion on beaches to the south—a trend that is particularly troubling as sea levels rise-and many of these beaches have become sand-starved, thereby damaging a key element of coastal resilience.

To address this challenge, we convened a group of ice plant restoration experts and launched an effort to restore 300 acres to native dune habitat. This is one of the largest ice plant restoration project in state history, and over time, we plan to expand the project to remove ice plant across the entire preserve.

STEELHEAD RECOVERY

Because they cover so much land, most watersheds are controlled by a patchwork of landowners, making it challenging to undertake comprehensive watershed restoration projects. But the Dangermond Preserve encompasses 97% of the Jalama Creek watershed, giving us an unprecedented opportunity to establish a stronghold for steelhead.

Having completed a major grant application and having begun work on a restoration blueprint this year, we are excited about having taken our first steps to restore steelhead to the Jalama Creek watershed. This watershed used to have a thriving steelhead run, which today has been almost entirely destroyed, largely because of a concrete dam and a bridge that were installed across the waterway. By removing these barriers and undertaking work to improve flows and the creek's natural watercourse, we are confident we can bring back this important species.

Bringing back a thriving steelhead run to Southern California will be a deeply impactful accomplishment because rebounding numbers in Jalama Creek could also help support populations in waterways elsewhere throughout the region. This is because, unlike salmon, steelhead do not exclusively return to the waterway from which they hatched, meaning a recovery in one river could help repopulate others. Because steelhead can also survive for years in river



systems that have been cut off from the ocean due to the kinds of drought cycles that are increasingly common in California, the species is highly resilient and, if supported, likely to rebound even amid a changing climate.

LOOKING AHEAD

The projects described above reflect our first steps in implementing the Dangermond Preserve's new <u>Integrated Resource Management Plan</u> (IRMP). A major milestone, we completed the IRMP in January 2020, thereby establishing a detailed roadmap for growing the preserve into an influential hub for science and education.

In the months and years ahead, the IRMP will guide us in developing the infrastructure, partnerships, science, and programming needed to make this place a wellspring of new conservation knowledge and a platform for launching research efforts with the potential for major global impact.



Mark Reynolds Lead Scientist, Dangermond Preserve

"Dangermond is wild, becoming wired, and we think it will change the world."

YOUR INVESTMENT

As the Jack and Laura Dangermond Preserve becomes a platform for generating solutions to protect vital natural resources in the face of climate change, your investment is having a profound impact on conservation in California. At a time when so many species and ecosystems are under threat, this work is more urgent than ever. So on behalf of everyone here at TNC, thank you. We look forward to sharing many more accomplishments in the years to come.