

Estimating Habitat Connectivity to Guide Wildlife Conservation and Management Planning at The Nature Conservancy's Jack and Laura Dangermond Preserve

Client:

The Nature Conservancy

Proposers:

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Objective: The overall objective is to describe and analyze wildlife habitat connectivity linking the Dangermond Preserve to other core habitat sites and regional areas of conservation importance. This work will support The Nature Conservancy's (TNC) planning and management of wildlife and landscape conservation at the Dangermond Preserve and inform TNC's long-term management plan for climate-resilient wildlife habitat connectivity. Bren students will engage in the conservation management planning process and other data & analytic approaches to inform management approaches. TNC has amassed a great deal of ecological data relevant to the property but has yet to create a comprehensive analysis that helps to visualize connectivity (including wildlife corridors) to other regional core habitat areas. In order to develop a long-term management plan for wildlife conservation at the preserve, TNC requires better information to set management goals.

The general objectives are:

- 1) Gather relevant wildlife presence information by analyzing existing wildlife camera photos from the preserve, adjacent properties, and California Department of Fish and Wildlife.

- 2) Initiate iterative modeling of habitat connectivity in the region drawing on and downscaling well-vetted statewide connectivity models/products such as Omniscape (<https://omniscape.codefornature.org/>), and California Department of Fish and Wildlife's Areas of Conservation Emphasis (<https://wildlife.ca.gov/Data/Analysis/ACE>).
- 3) Provide recommendations for conservation design for wildlife conservation at the Dangermond Preserve, including optimization and alternative scenarios for connectivity.

Background: The Nature Conservancy's recent establishment of the Dangermond Preserve (<https://www.nature.org/en-us/about-us/where-we-work/united-states/california/stories-in-california/dangermond-preserve/>), a nearly 25,000-acre protected area at Point Conception, presents a rare opportunity to engage historical information in designing effective protection, restoration, and management.

With many sacred Chumash sites and its unique location at Point Conception where the cold Pacific current meets the warmer waters from Baja California, the Preserve represents an area of exceptional natural and cultural value. Site surveys show it is home to over 50 endangered and rare species, making it a hotspot for biodiversity. The land was previously known as the Cojo and Jalama Ranches, or collectively, the Bixby Ranch. Starting as a Spanish land grant, the property was ranched for over 100 years and is home to oak woodlands, coastal prairies, and eight miles of untouched coastline. Furthermore, the preserve has a large public interface: "The property is at the intersection of many interests" — the Chumash, the military, surfers, ranchers and developers, Bell said. "It makes this land a conservation puzzle" (Los Angeles Times 2017).

Significance: The Nature Conservancy's recent establishment of the Jack and Laura Dangermond Preserve, a 25,000-acre protected area at Point Conception, Santa Barbara County, California, presents a rare opportunity to engage regional landscape analysis in designing effective wildlife protection, restoration, and management. TNC has developed a comprehensive resources assessment and overarching management plan – The Dangermond Preserve Integrated Resources Management Plan (Butterfield et al. 2019) and must create and implement an implementation plan that addresses the positioning of the Dangermond Preserve as a critical landscape in the connectivity of suitable habitat necessary for wildlife population persistence in the region. The assessment provided by the Bren School project will feed directly into The Nature Conservancy's goal setting and management planning for wildlife conservation and landscape protection in the region. The project will be an excellent opportunity for students to engage with on-the-ground conservation efforts, working closely with TNC staff on the stewardship and science and communications around managing connectivity of wildlife habitat at an ecologically and culturally significant site.

Equity: This project addresses environmental justice by assisting in the restoration of a unique protected area to be used to teach students of all ages and backgrounds. Further, restoring historic Chumash lands facilitates the teaching of Chumash history and allows the people to perpetuate their culture. By devising solutions to improved wildlife connectivity, this project contributes to the long-term protection and conservation of this land.

Available Data: The Nature Conservancy has amassed a great deal of ecological data relevant to the property including over 400,000 individual images from a camera trap array from 2012-2014 and 75+ GIS layers from both public and private sources including wildlife occurrences, vegetation, infrastructure, and abiotic factors (see references).

Research Questions & Approaches:

- 1) Historical Analyses
 - a. How has wildlife habitat connectivity changed from a recent historical perspective (e.g. the past 100 years for which data are available)?
 - b. How have predator communities changed from a recent historical perspective (e.g. post-settlement changes in animal communities)?
- 2) Connectivity Analyses
 - a. What is the current status of habitat connectivity as well as barriers to connectivity within the Dangermond Preserve and adjacent landscape including Vandenberg Air Force Base and neighboring ranch lands?
 - b. What are projections for future habitat connectivity under different conservation scenarios?
 - c. What are projections for future predatory community composition under different conservation scenarios?
 - d. How is the Dangermond Preserve positioned as a critical area for the habitat connectivity needed for wildlife population persistence?
- 3) Management recommendations
 - a. What are recommendations for conservation and management that will enhance the value of the Dangermond Preserve as a critical linkage site for habitat connectivity in the region?
 - b. How can TNC manage the Dangermond Preserve for climate-resilient wildlife connectivity?

Deliverables:

- 1) An analysis of regional habitat connectivity in and around the Dangermond Preserve
- 2) Creation of map products, cartography, and GIS geodatabases that will be useful for the TNC Dangermond Conservation Team for modeling and conservation planning
- 3) Summary document/communications piece on current connectivity estimates and potential corridor design, including an Esri StoryMap.

Internships: The Nature Conservancy will support the project with up to three internships at \$5,000 each for a total of \$15,000 to facilitate Bren students to continue working closely on this project over the summer.

References:

Butterfield, H.S., M. Reynolds, M.G. Gleason, M. Merrifield, B.S. Cohen, W.N. Heady, D. Cameron, T. Rick, E. Inlander, M. Katkowski, L. Riege, J. Knapp, S. Gennet, G. Gorga, K. Lin, K. Easterday, B. Leahy and M. Bell. 2019. Jack and Laura Dangermond Preserve Integrated Resources Management Plan. The Nature Conservancy. 112 pages.

Los Angeles Times. 21 December 2017. <https://www.latimes.com/local/california/la-me-conservancy-purchase-20171221-story.html>

The Nature Conservancy (TNC), California Chapter. 2018. Landscape Connectivity using Omniscape.

Available data: TNC has amassed a wealth of data relevant for this project.

- over 400,000 individual images from a wildlife camera trap array from 2012-2014
- 75+ GIS layers from both public and private sources including:
 - Wildlife occurrences – including surveys for mammals, bats, birds, herptiles, camera traps, mistnets, traplines, acoustic sensor arrays, etc.
 - Vegetation – fine scale (1:12,000) vegetation maps, rare plant locations
 - Infrastructure – ranch buildings, roads, gates, fences, oil and gas features
 - Archeological sites from the Central Coast Information Center (CCIC)
 - Aquatic – streams, wetlands, springs, monitoring locations
 - Geology – soils, country rock, landslides
 - Imagery –air photos, and satellite imagery
- Wieslander Vegetation Type Mapping (<http://vtm.berkeley.edu/#/home>)
- Biological surveys by WRA Environmental Consultants Inc.
- Biological Assessment 2008 from Althouse and Meade
- 500+ landscape classifications from professional-level ArcGIS Living Atlas collection
- Others including: Fire history, grazing history, human history, data and analysis from previous Bren Group Masters projects

Existing TNC and related partner projects focused on habitat connectivity mapping:

- Omniscape (TNC 2019):
<https://www.arcgis.com/apps/webappviewer/index.html?id=3cbb9454372e43ffac44b9dda07b5551>
- CDFW Areas of Conservation Emphasis: <https://wildlife.ca.gov/Data/Analysis/ACE> *includes Omniscape
- California Coastal Resilience: <https://coastalresilience.org/project/conservation-assessment/>
- Coastal and inland connectivity project:
<https://www.nature.org/content/dam/tnc/nature/en/documents/nh-connect-the-coast-report.pdf>
- Pepperwood Preserve analysis on connectivity:
<https://conservationcorridor.org/cpb/M2B-Final-Report.pdf>



January 22, 2021

To:

Group Project Committee

Bren School of Environmental Science and Management

Bren Hall, 2400 University of California, Santa Barbara, CA 93117

From:

Mark Reynolds, Ph.D.

Lead Scientist, Dangermond Preserve

The Nature Conservancy

mreynolds@tnc.org

On behalf of The Nature Conservancy (TNC), I am pleased to endorse the proposed master's project proposal 'Estimating Habitat Connectivity to Guide Wildlife Conservation and Management Planning at The Nature Conservancy's Jack and Laura Dangermond Preserve'. The Conservancy is excited to utilize the interdisciplinary skills of Bren School students and faculty to explore and analyze data on wildlife connectivity at the Preserve in order to create a management plan that will ensure wildlife connectivity in this important part of California is resilient in the face of environmental change.

This letter serves to highlight The Nature Conservancy's support for the Bren Group Project and for funding support for up to three internships to facilitate Bren students to continue working closely on this project over the summer.

We look forward to your favorable consideration of our proposal.

Sincerely,

A handwritten signature in black ink that reads "Mark Reynolds".

Mark D. Reynolds, Ph.D.

Lead Scientist, Dangermond Preserve

The Nature Conservancy of California