Assessing Approaches for Feral Pig Management at The Nature Conservancy's Jack and Laura Dangermond Preserve

Client:
The Nature Conservancy

Proposers:
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Faculty Sponsors:
Chris Costello – Professor, Resource Economics

Objective:
The overall objective is to compile and analyze existing data and information that can support TNC's planning and management of feral pigs at the Dangermond Preserve. Thus, TNC is proposing a project to analyze existing data and management strategies for feral pig management at Dangermond Preserve to inform TNC's long-term management plan to reduce and/or eliminate the negative impacts of feral pigs on the preserve's natural and cultural resources. 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 is lacking in baseline information related to feral pig populations and impacts. To develop a long-term management plan for feral pigs at the preserve, TNC requires better information to set management goals.

- Analyze existing wildlife camera photos from the preserve, gather pig harvest data from adjacent properties and California Fish and Wildlife.
- Analyze a suite of management approaches for feral pigs at similar sites across California
- Provide guidance setting long-term management goals and methods for feral pigs at the Dangermond Preserve

Background:
The Nature Conservancy's recent establishment of the Dangermond Preserve (Los Angeles Times 2017), a 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"' (LA Times).

Significance:

The Nature Conservancy (TNC) purchased the Jack and Laura Dangermond Preserve (JLDP), formerly known as the Cojo/Jalama Ranch, in December 2017. Since the acquisition of the property, TNC has completed a comprehensive Integrated Resource Management Plan (IRMP) that sets the vision and foundation for the preserve's management into the future. The IRMP identifies TNC's top priority at the JLDP to protect, restore and manage the preserve's natural and cultural resources. Effectively managing the preserve's wild pig population will be key in protecting, restoring and managing the natural and cultural resources. The scientific literature is clear that non-native wild pig populations cause significant negative impacts to California native species. At the JLDP, pigs are frequently observed. Due to the presence of wild pigs and their impacts to the natural and cultural resources at the JLDP, TNC must create and implement a management plan that addresses the impacts of wild pigs on the preserve's natural resources. The assessment provided by the Bren School project will feed directly into The Nature Conservancy's goal setting and management planning for feral pigs on the preserve. 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, science and communications around managing invasive species at an ecologically and culturally significant site.

Available Data:

TNC has amassed a great deal of data relevant to the property:
75+ GIS layers from both public and private sources in the following categories with example data types (not exhaustive)

- Wildlife – including surveys for mammals, bats, birds, herptiles, camera traps, mist nets, 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 – Archival ground photos, 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 Texas A&M
- Others including: Fire history, grazing history, human history

Possible Approaches:

- Gather and analysis existing data on feral pig populations on the preserve, on adjacent properties and with Santa Barbara County and California (wildlife camera photos, harvest reports, populations studies)
- Synthesize and evaluate a suite of management approaches for feral pigs in coastal California, including impacts of feral pigs, effectiveness of control measures, and costs associated with management approaches.
- Analyze the cost and benefits of various management approaches for feral pigs that can inform TNC's long-term decision making
- Initial Learning Objectives and Research Questions include:
    - What is the wild pig population on the Dangermond Preserve? What are the spatial and temporal distribution of pigs on the preserve?
    - Can we utilize the historic wildlife camera photos (2012-2014) to inform our pig management objectives?
    - What is the bioeconomic impact of invasive pigs on the biodiversity, aquatic habitat, and other sensitive ecosystems on the preserve?

Deliverables:

- A cost-benefit analysis of three conservation scenarios for pig management.
    - Eradicate wild pig populations on the preserve? (full preserve fencing)
    - Manage wild pig populations? (managed public hunting program, monitoring)
    - Reduce damage from wild pig populations? (fencing managed areas)
- Characterization of invasive pig population though a mixed methods approach
    - Utilizing camera trap photos (2012-2014), field studies, and compilation of county records and reports to describe abundance/density, spatial, and temporal dynamics of pig populations
- Bioeconomic model to characterize the impacts of invasive species on shoreline biodiversity, aquatic habitat.
- Community outreach material on environmental and economic cost of invasive pigs.

Internships:

The Nature Conservancy will support the project with 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.