

Analyzing and Managing the Ecological Impacts of Environmental Education, Recreation, and Research on Nature Reserves

Case Study: The Jack and Laura Dangermond Preserve in Lompoc, California

Proposers:

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Objectives:

The overall objective of this project is to analyze the potential ecological impacts of environmental education and other activities on nature preserves, and to develop a long-term monitoring program that can be used by preserve management agencies. We will use the Jack and Laura Dangermond Preserve in Lompoc, California as a case study, which is currently managed by The Nature Conservancy (TNC). Throughout this project, students will:

- Conduct a literature review on the benefits of environmental education in comparison with the benefits of preserved space. Ensure that the goals of the environmental education program are aligned with the goals and mission of TNC.
- Analyze available data and literature to assess the effects of recreation and tourism on managed lands that are similar to the Dangermond Preserve as a comparative study.
- Determine which ecosystems/species are most sensitive. This will help regulate which areas of the preserve to avoid during environmental education lessons.
- Assess the user carrying capacity per month/year on the preserve
- Analyze the biological, economic, and social costs and benefits of the environmental education program.
- Develop a long-term monitoring program/model to assess impacts on different areas/ecosystems within the preserve (can be used by TNC staff, students, visiting researchers, citizen scientists, etc.).

Significance:

This project is a necessary step in the development of TNC's environmental education program at the Dangermond Preserve. While current projects are working on compiling baseline data on the ecological health and integrity of the preserve, this data must be coupled with an assessment of the ecological and economic costs, however minimal, that citizen access will have on the landscape in order to determine the best management strategies for the future. This research will not only aid in conservation management planning on the preserve but will also guide the development of appropriate curricula for visiting students.

Background:

The Nature Conservancy established the Jack and Laura Dangermond Preserve in 2017, ensuring the permanent protection of over 24,000 acres of biologically diverse habitat and 8 miles of coastline in Santa Barbara County (The Nature Conservancy, 2017). This area, which encompasses the Cojo/Jalama Ranch at Point Conception, has unique ecological, cultural, and historical value. TNC is planning to implement an environmental education program on the preserve that will share these values with students in the Lompoc school district. With this new initiative, TNC must evaluate the potential impacts that this program (and future activities) will have on the rare and fragile ecosystems within the preserve.

Available Data:

- GIS data for the preserve (layers include wildlife, vegetation, infrastructure, aquatic areas, and geology) provided by TNC
- Historical ecological data (compiled by current 2nd year MESM students)
- The National Park Service research databases for comparative studies (publicly available)

Possible Approaches:

- Conduct a literature review of the effects of recreation and tourism on managed lands for comparative study. Interview environmental education and land management agencies to identify various management strategies for education programming.
- Review GIS data and biological surveys to determine ecologically sensitive areas. Some areas may be deemed inaccessible to student groups based on conservation goals or possible risk associated with access.
- Review TNC's geodatabase to see past vegetation succession on the preserve as a baseline for future dynamics.
- Develop a model that will assess different environmental education scenarios - compare different potential trail systems, group size, activity type, location on the preserve.
- This model will be used to analyze how different education programs (e.g. different size groups, ages, length of program, various activities) affect vegetation and wildlife.

Deliverables:

Beyond a final written report, policy brief, poster, and oral presentation, the following materials will be provided by the students:

- Management recommendations for environmental education program based on impact assessment.
- Predictive model to be used in order to analyze the effects of recreation/visitor access on different ecosystems within the preserve. This may be used by TNC staff, students, visiting researchers, citizen scientists, etc.
- Maps for student/visitor use highlighting trails used during education programs.

Internships:

The Nature Conservancy will fund two paid intern positions at \$5,000 each for a total of \$10,000 to support the group project during the summer of 2019.

Supplemental Materials and Relevant Literature:

Hadwen, Wade L., et al. "Icons under Threat: Why Monitoring Visitors and Their Ecological Impacts in Protected Areas Matters." *Ecological Management & Restoration*, vol. 8, no. 3, 2007, pp. 177–81. Wiley Online Library, doi:10.1111/j.1442-8903.2007.00364.x.

Jeffrey L. Marion & Scott E. Reid (2007) *Minimising Visitor Impacts to Protected Areas: The Efficacy of Low Impact Education Programmes*, *Journal of Sustainable Tourism*, 15:1, 5-27, DOI: [10.2167/jost593.0](https://doi.org/10.2167/jost593.0)

Marion, Jeffrey. *Developing a Natural Resource Inventory and Monitoring Program for Visitor Impacts on Recreation Sites: A Procedural Manual*. Natural Resources Publication Office, 1991, <http://npshistory.com/publications/interdisciplinary/im/nrr-91-06.pdf>.

Pearsall, Samuel Haff. "In Absentia Benefits of Nature Preserves: A Review." *Environmental Conservation*, vol. 11, no. 1, ed 1984, pp. 3–10. *Cambridge Core*, doi:10.1017/S0376892900013436.

The Nature Conservancy. *The Nature Conservancy Preserves 24,000-Acre Coastal Ranch at Point Conception with \$165 Million Gift from Esri Founders*. 21 Dec. 2017.

Wells, Nancy M., and Kristi S. Lekies. "Nature and the Life Course: Pathways from Childhood Nature Experiences to Adult Environmentalism." *Children, Youth and Environments*, vol. 16, no. 1, 2006, pp. 1–24.



January 24, 2019

Letter of Support

To: Group Project Committee, Bren School of Environmental Science & Management

On behalf of The Nature Conservancy, we are pleased to endorse the proposed master's project proposal concerning the ecological impacts of environmental education on the Jack and Laura Dangermond Preserve. The Conservancy is developing a strategy for targeted environmental education programs, and this proposal is a key opportunity to harness the interdisciplinary skills of Bren School students and faculty to answer important questions about the size, scope and siting of education programs at the Preserve. The results of this project will be incorporated into the Conservancy's planning efforts to balance education program development with conserving the natural and cultural resources at the Preserve.

This letter serves to highlight The Nature Conservancy's support for the Bren Group Project and for funding support for two internships at \$5,000 each for a total of \$10,000 to facilitate Bren students to continue working closely on this project over the summer.

We look forward to your favorable consideration of our proposal.

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

Mark Reynolds
Lead Scientist
Jack and Laura Dangermond Preserve
The Nature Conservancy

A handwritten signature in black ink that reads "Brea Jones".

Brea Jones
Environmental Education Lead
& Chief of Staff
The Nature Conservancy