

- THE NATURE CONSERVANCY IN CALIFORNIA -

CONSERVATION SCIENCE CATALYST FUND

2017 Annual Report



© Ian Shive

FROM THE DIRECTOR OF SCIENCE

The Nature Conservancy deploys science to help overcome major challenges facing people and nature. In today's fast-paced world, turning threats to nature into opportunities for conservation requires agility. The Conservation Science Catalyst Fund enables our science team to mobilize quickly — and produce the information and insights we need for conservation to succeed. The results from our investments over the past year demonstrate the power of Conservancy science. Thank you for your support of this critical work.

—Scott Morrison, Ph.D.
The Victor E. Shelford Director of Conservation Science
California

CATALYZING SCIENCE FOR CONSERVATION

Cutting-edge science and technology are essential if we are to rise to the challenge of conservation in an increasingly crowded, complex and constrained world. Innovative and effective conservation strategies demand new knowledge and evidence-based solutions. The Conservation Science Catalyst Fund supports the bold science needed to help set a global conservation science agenda and position the Conservancy for influence and impact. The Catalyst Fund empowers our scientists with the resources they need to quickly mobilize productive scientific initiatives to address emerging issues and opportunities and establish scientific foundations for conservation action – all with the aim of increasing the pace and scale of conservation.

Some of the key scientific questions facing conservation today include:

- How can we enhance the resiliency of nature in the face of a changing climate?
- How can we leverage emerging technologies to make conservation more efficient and effective?
- How is conservation relevant to people and human well-being?

SCIENCE LEADERSHIP

Conservancy scientists play a unique role in the conservation science community, one that is distinct from the role of scientists in academia, government or consultancies. We work at the interface of science and practice to elucidate the priority questions that must be addressed in order to make critical conservation decisions. We then convene the scientific collaborators we need to help us address those questions.

The Conservancy attracts partners who share our desire to delve into scientific inquiry that directly informs conservation decision making. The Catalyst Fund provides us with resources to incentivize this collaboration. Our research partners in turn often augment our investment with resources from their own institutions. The resulting collaborative research enterprise frequently continues well past a given project, branching off to address other important questions. A strong network of productive scientific partnerships is an enduring legacy of the Catalyst Fund.



OCEANS | FISHERIES

Transforming Data Collection with New Technology

\$10,000 (June - December 2017)

Management of abalone is challenging for the same reason that plagues most fisheries: lack of data. The Conservancy and collaborators have developed a cost-effective app for collecting much-needed data on abalone size using image-recognition technology. Using our app, recreational abalone divers can serve as citizen scientists by uploading photos of their catch. **Support from the Catalyst Fund enabled our scientists to test and prove the effectiveness of this new technology.** We are now working to integrate this approach into the State of California's abalone management plan, which would be the first time citizen-collected data have been used in fisheries management and would open the door to scaling this idea to other fisheries.

LAND | ISLANDS

Deploying a Detection Dog for Conservation

\$82,924 (June - December 2017)

Conservancy scientists created a cutting-edge method for eradicating Argentine ants on Santa Cruz Island, and it appears to have been successful. Yet, how can we know for sure they are indeed gone, given how difficult they are to detect? Standard detection methods are extremely time-consuming. **The Catalyst Fund allowed scientists to test a new approach: training a dog to detect this specific species of ant.** Over this past summer, our dog-and-handler team detected no Argentine ant colonies in an area where there had been a very large infestation – which is further evidence that our eradication method worked. We are now sharing our method with conservationists around the world to help local communities whose resources and livelihoods are threatened by these pests.

OCEANS | COASTAL

Conserving Our Coastlines in the Face of Sea-level Rise

\$66,593 (October 2017 - October 2018)

Sea-level rise will destroy a large proportion of California's already imperiled coastal habitats. In response, Conservancy scientists are identifying key coastal strongholds that need to be the focus of conservation investment. **With the Catalyst Fund, we are developing a statewide action plan to address sea-level rise and guide conservation.** The plan will include the identification of areas, such as agriculture and low-development zones, that could be restored to provide new, natural habitat as waters push inland. And in partnership with economists and other collaborators, Conservancy scientists are identifying specific parcels for protection and developing strategies for their conservation.

OCEANS | FISHERIES

Building a Bioeconomic Model for Tuna in the Pacific

\$140,000 (January - December 2017)

The Pacific tuna fishery is one of the most valuable fisheries in the world, but it faces a number of challenges, including high rates of bycatch – the accidental catch of non-target species. To improve the sustainability of the fishery, the **Catalyst Fund is supporting Conservancy staff and collaborators to conduct a bioeconomic evaluation of alternative management options for Pacific tuna fisheries.** For example, we are looking at the impacts of the current scheme of regulating fishing effort (the number of days fished) versus one that regulates catch (the number of fish caught). This model will be key to understanding the likely economic and environmental impacts of different management strategies and will demonstrate the value of improving the accuracy of various data streams to drive better decision making.

LAND | AGRICULTURE

Multi-benefit Targeting and Assessment of Strategic Land Retirement

\$83,400 (June 2017 - April 2018)

Intensive agriculture has expanded dramatically in the major river valleys of California. New groundwater sustainability policies, however, are going to shift land use in these landscapes over coming decades. The San Joaquin Valley is the epicenter of these changes, where groundwater regulations will lead to roughly 50 percent of irrigated land coming out of production in

certain water districts. **With backing from the Catalyst Fund, Conservancy staff are building models that select lands for retirement and restoration based on optimizing water sustainability and habitat value.**

This project will provide the foundational science needed to maximize the outcomes for both nature and people, as well as the information needed to structure financial incentives based on ecosystem service benefits.



CLIMATE CHANGE

Climate Change Science Fellow

\$200,000 (July 2016 - July 2018)

Beginning in July 2016, the **Catalyst-funded Climate Change Science Fellow**, Dr. David Marvin, analyzed the potential of conservation and ecosystem management to help minimize statewide greenhouse gas emissions. In an analysis published in the *Proceedings of the National Academy of Sciences*, Conservancy scientists and research partners show that conservation and changes in land use and management – like forest management and wetland restoration – could achieve as much as 17 percent (nearly one-fifth) of the cumulative greenhouse gas reductions California needs to meet its 2030 goal. We are now using this work to encourage the state to set an aggressive target for conservation and restoration as a means to advance climate goals. The integration of these strategies into state climate policy would be precedent-setting and could serve as a model globally.

OCEANS | COASTAL

Desalination by Design

\$42,000 (October 2015 - March 2018)

Desalination is often discussed as a solution to California's escalating freshwater crisis, yet it can pose serious threats to marine and coastal habitat. **With the Catalyst Fund, we analyzed the ecological impacts of desalination plants.** We are now using that analysis to inform plant siting and design in order to avoid

unnecessary environmental damage. In April 2017, we co-convened an “Uncommon Dialogue” at Stanford University on the topic, producing a white paper that revealed that desalination is unlikely to significantly alter the basic water budget in California and highlighted the need for a comprehensive framework to guide future desalination projects.

LAND | CONNECTIVITY

Modeling Habitat Connectivity in California

\$110,000 (October 2015 - December 2017)

Habitat fragmentation is a pervasive conservation challenge. **With support from the Catalyst Fund, our science team developed an innovative model that borrowed principles of resistance and flow from electrical engineering to map habitat connectivity across the state.** We are now working to integrate our models into the conservation priorities of the State of California to increase funding for projects that improve connectivity by preventing chokepoints and by keeping large areas of land intact for wide-ranging species.

OCEANS | FISHERIES

Improving Fisheries Management

\$100,000 (October 2015 - March 2018)

Better fisheries management in California requires better data. Unfortunately, trawl surveys – a commonly used monitoring method – provide little information about rockfish. Pairing visual surveys of rocky habitats with trawl surveys could revolutionize stock assessments for these important species. **With Catalyst Fund support, our scientists and collaborators developed and tested this novel approach** that included developing a stereo underwater camera system that allowed us to monitor overfished species, while also experimenting with modified fishing gear. The surveys revealed that fishermen could fish with the modified gear and catch the abundant species while rarely catching the overfished species. The team is now developing a paper on the results and the potential for using our method to improve rockfish management.

LAND | AGRICULTURE

Managing Farms for Biodiversity

\$145,000 (May 2015 - May 2017)

More than 10 million acres in California are dedicated to farming, but few of these landscapes are managed to support biodiversity and ecological resilience. **Backed by the Catalyst Fund, Conservancy staff are developing the science needed to enhance wildlife-friendly farming practices.** With a multitude of collaborators and expert advisors, we conducted a groundbreaking review of 20 agricultural management practices and their impacts on crop yield and the environment. The results clearly indicated the benefits of sustainable practices. That evidence base is now published, and we are employing lessons learned on our own farm holdings in order to demonstrate their benefits.

COMPLETED PROJECTS

OCEANS | FISHERIES AND CLIMATE CHANGE

Assessing and Mitigating Climate-related Risks to California's Fisheries and Fishing Communities

\$15,513 (August - December 2016)

OCEANS | PLANNING

Returning to Evaluate the First Marine Protected Areas Network in the U.S.

\$170,000 (March 2015 - March 2017)

OCEANS | FISHERIES

Resurvey of California Rock Crab Fishery to Support SNAPP Data-limited Fisheries Case Study

\$40,000 (April 2016 - April 2017)

OCEANS | COASTAL

Phones and Drones: El Niño Monitoring Initiative

\$10,000 (December 2015 - July 2016)



Scott Morrison

Director of Conservation Science & Programs
smorrison@tnc.org . 415.963.6603