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FROM THE DIRECTOR OF CONSERVATION SCIENCE

This past year was one of extraordinary challenges. While historians will be grappling with what 2020 exposed about society well into the future, one lesson is already abundantly clear: the fates of people and nature are inextricably linked. There is no separating the fire ecology of California's ecosystems, for example, from our ability to live safely within them. And for many, it was nature that provided the sanctuary to maintain some degree of personal well-being amid the hardships of a global pandemic.

More than ever, the world needs what The Nature Conservancy brings: proof that people and nature can thrive together. But finding those solutions requires science—science to figure out what nature needs and to discover how meeting those needs can be accomplished alongside other important societal objectives. The Science Catalyst Fund empowers our scientists with the resources to quickly mobilize scientific initiatives, address emerging threats and opportunities, and test promising new approaches—all with the aim of increasing the pace and scale of conservation.

This past year, the fund further expanded its portfolio of innovative and high-impact applied science. Thank you for investing in a hopeful and resilient future by investing in the science necessary to create it.

—Scott A. Morrison, Ph.D.

The Victor E. Shelford Director of Conservation Science, Director of Conservation Programs

CATALYZING SCIENCE FOR CONSERVATION

To be successful in our increasingly crowded and constrained world, conservation needs cutting-edge science and technology. The Conservation Science Catalyst Fund supports the bold and innovative science needed to help set a global conservation agenda and position TNC for influence and impact. The fund provides our science teams with the resources to quickly launch projects in response to emerging opportunities and urgent environmental issues, ultimately accelerating the pace and expanding the scale of TNC's work.

Some of the key scientific questions facing conservation today include:

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

SCIENCE LEADERSHIP

TNC scientists play a unique role in the conservation science community. We work at the interface of science and practice to elucidate questions that inform critical conservation decisions. We then convene the scientific collaborators we need to address those questions.

The Science Catalyst Fund provides us with resources to incentivize collaboration with leading-edge partners. In turn, our research partners 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 fund.



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NEW PROJECTS: 2020

POST-FIRE REGENERATION STUDY FOR WESTERN U.S. FORESTS

\$25,000 (September 2020 – November 2021)

A key strategy for addressing climate change is to reduce atmospheric carbon by keeping it locked in trees and soil. Dramatic increases in the size and severity of wildfires, however, threaten carbon stores in many Western U.S. forests, and as climate change leads to warmer and drier conditions, catastrophic wildfires could result in the conversion of forests to shrublands and grasslands that have lower carbon storage potential. The extent of this conversion will depend upon which trees survive (e.g., large seed-bearing trees) and the rate of forest regrowth after severe fires.

As catastrophic wildfires become increasingly frequent, the impact on forest recovery and carbon sequestration is not well understood. **To help fill this knowledge gap, the Science Catalyst Fund is investing in research and geospatial analysis to assess the current and future risk of forest and carbon-storage loss in post-fire landscapes in the West.** This research will highlight where large-scale restoration has the greatest potential to reduce carbon losses and forest conversion, thereby helping TNC, public agencies, and other conservationists better allocate resources.



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OCEAN RECOVERY RESEARCH POSITION

\$60,000 (September 2020 – September 2021)

From climate change to pollution to overfishing, ocean ecosystems face a multitude of threats. These stressors have imperiled numerous marine species that are ecologically, economically, and culturally important, and urgent restoration actions are needed. Unfortunately, the science of species restoration in the ocean remains decades behind that of terrestrial and freshwater systems. **So, with the support of the Science Catalyst Fund, TNC is examining the potential for species-level management interventions to advance restoration and resiliency in the world's oceans.** (continued)

The funds will support a post-doctoral scholar who will develop a comparison of opportunities, strategies, and needs for restoring terrestrial versus ocean species. The work will include a consideration of socioeconomic costs and benefits, knowledge gaps, and scientific frontiers. We plan to use the research to advocate for increased public and private investment in marine biodiversity protection.



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UPDATES ON 2019 PROJECTS

ISLAND CONSERVATION SCIENCE FELLOW

\$250,000 (May 2019 – June 2021)

Island ecosystems are hotspots for biodiversity—and extinction. They are also inspiring examples of how targeted, discrete management interventions can deliver transformative conservation outcomes. **In 2019, the Science Catalyst Fund invested in a Conservation Science Fellow, Nick Holmes, to set an ambitious conservation agenda for these unique and imperiled ecosystems.** That work led to the articulation of an Island Resilience Strategy, which Dr. Holmes stepped up to lead in 2020. A key pillar of this strategy leverages the applied conservation science developed on TNC's preserves at Palmyra Atoll (where we are conducting an innovative rainforest restoration project) and Santa Cruz Island (where we brought back the Santa Cruz Island fox from the brink of extinction) to spur island restoration efforts across the Pacific.



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WILDFIRE BUFFER PROJECT IN PARADISE, CALIFORNIA

\$40,000 (October 2019 – April 2020)

Many Californians are living in areas that are unsafe and becoming more dangerous as the climate changes. The 2018 Camp Fire that consumed Paradise, California, was one of the most destructive wildfires in the state's history, killing 85 people and destroying nearly 14,000 homes. Today, communities and public agencies are urgently looking for ways to reduce such climate-exacerbated risks to people and property. We know that ceasing to build in fire-prone areas can reduce some risk, but what about community design and using open space buffers to reduce wildfire risk?

With the support of the Science Catalyst Fund, TNC explored the science of establishing risk-reduction buffer zones around communities. Working with local leaders over the past year, we built a model that helped identify the locations and extent of potential land-use buffers around Paradise. These proposed buffers, which include the creation of a greenbelt that encircles the town, could not only reduce fire risk to the community but also provide recreation opportunities and multiple conservation benefits. TNC is now working with local leaders to determine how best to implement the proposed multi-benefit buffers.



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ONGOING IMPACT FROM COMPLETED PROJECTS

HIGHLIGHT:

Applying Technology to Close the Fishery Data Gap



Around the world, reliable information on fishery stock health is scarce. Traditional stock assessments are costly, slow, and unable to scale to the thousands of fisheries that need them. As a result, fishery managers do not have the data they require to sustainably regulate their fisheries and implement rules that prevent fish populations from collapsing.

To tackle this challenge, **TNC mobilized the Science Catalyst Fund to help develop a software solution that makes stock assessments fast, affordable, and easy to implement.** With our partners at the University of California, Santa Barbara, we developed Poseidon, an application that can be used by anyone with a camera and a computer. With Poseidon, users measure their catch against a standard marker, upload their images to a shared platform, and then the application uses machine learning to transform length data into information that helps fishing communities make real-time decisions about how to keep their fisheries healthy.

TNC first piloted a version of Poseidon in California's red abalone fishery, where a lack of data was causing major concerns for fishery managers. In testing the new approach, we were able to tap the enthusiasm of more than 25,000 recreational divers who participate in the fishery each year, mobilizing divers to become citizen scientists and use their smartphones to collect length measurements.

TNC has now tested Poseidon in a scallop and mussel fishery in Mexico, the spiny lobster and nearshore finfish fisheries in California, and the emperor fish fishery in French Polynesia. In the months and years ahead, we plan to deploy Poseidon in many of the thousands of unmeasured and unmanaged fisheries around the globe, democratizing data collection and lowering the costs of sustainable resource management. Thanks to the Science Catalyst Fund, Poseidon is poised to help close the global data gap and empower communities to better manage their marine resources.