

MOORE CENTER FOR SCIENCE YEAR IN REVIEW 2019

+ LOOK AHEAD
TO 2020



CONSERVATION
INTERNATIONAL

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Highlights



2019 was a remarkable year for Conservation International and the Betty and Gordon Moore Center for Science.

- We aligned around new strategic priorities – our Southern Cross – that reaffirmed the central role of science in our mission and strategy.
- We blazed new trails at the frontiers of conservation science and built a foundation for the next generation of conservation policy and practice.
- We designed a portfolio of research initiatives that will lead us into 2020, setting us up to inform and influence new policy agendas and targets for the next decade.

Conservation International values science as a cost-effective strategy for transformative global change and is widely recognized for our pioneering research. Our Trends.Earth team, for example, recently received the 2019 Sustainable Development Goals Award from the Group on Earth Observations (GEO), a global network of over 200 governments and participating organizations dedicated to the use of earth observation systems for sustainable development. Trends.Earth used the aggregated information from this network effectively and efficiently to help countries identify and map degraded lands, empowering them to restore these ecosystems as part of their sustainable development agenda.

The Moore Center for Science at Conservation International is one of the world's premier conservation research units. We continue to publish breakthrough research and grow the body of evidence upon which humanity depends. To date, Conservation International has published more than 1000 peer-reviewed articles, many in leading journals like *Science*, *Nature*, and the *Proceedings of the National Academy of Sciences*. In 2019, Moore Center scientists and collaborators published 51 peer-reviewed articles, and have 27 additional manuscripts currently in preparation or under review.

On average, each of our scientific papers is cited more than 45 times by other scholars – more than any other U.S. conservation organization and leading universities like Harvard, Yale, Duke, and Stanford.

With science and facts under attack, and the window for a sustainable future starting too close, the work of the Moore Center for Science has never been more critical. On behalf of my team, colleagues and all of our partners, thank you for enabling Conservation International to serve as the global vanguard of conservation science. We are generating the insights and solutions necessary to sustain nature for humanity.



Michael B. Mascia, Ph.D.
Senior Vice President
Moore Center for Science

The Moore Center for Science Strategy

Generating Transformative Change

Driven in large measure by the work of the Moore Center for Science, Conservation International's institutional strategy—a.k.a our Southern Cross—is dedicated to generating specific solutions to the most pressing conservation and development issues facing the planet.

Over the next five years, CI is doubling our investments in protecting and restoring tropical forests and mangroves to combat climate change. In select landscapes and seascapes, we are creating scalable models of sustainability built upon the protection of nature as a service for human prosperity. We want to double the amount of protected areas in our oceans, a realm woefully unexplored, yet crucial to climate stability and all life on Earth. We are using innovation in science and conservation finance to deepen our understanding of humanity's relationship with nature and generate long-term financial security for conservation.

This strategic focus has enabled the Moore Center for Science to launch a systematic process to identify and answer three basic, yet deceptively complex, questions that are central to the quest for sustainability:



Where is the nature people need?

How can we best conserve nature for people?

What are the impacts of conserving nature?



PRIORITIES

WHERE IS THE NATURE THAT PEOPLE NEED?

Nature has a crucial role to play in global sustainability, but we require a better and more nuanced understanding of nature's part in sustainable development at global, national and landscape/seascape scales. Put plainly, we need to understand where nature makes essential contributions to humanity in order to set priorities and guide investment.



STRATEGIES

HOW CAN WE BEST CONSERVE NATURE FOR PEOPLE?

To maintain nature for people, society deploys conservation interventions in a range of contexts. Our research and decision-support tools empower governments, corporations, indigenous peoples, and other key decisionmakers to design tailored strategies that best conserve nature for people.



IMPACTS

WHAT ARE THE IMPACTS OF CONSERVING NATURE?

Evidence on the effectiveness of conservation policies and programs – what works and what does not – is essential to inform decisions and to demonstrate progress towards CI's mission, yet the impacts of most conservation interventions are poorly understood. Our research on the social and ecological impacts of conservation interventions catalyzes accountability, learning, and evidence-based decision making for smarter and more impactful actions.

Our answers to these questions are delivering transformative change: informing and influencing policy, changing conservation practices, and leveraging conservation investments globally.

Our emerging portfolio of Moore Center initiatives addresses these questions and will ensure our science realizes its full potential as a strategy for transformative global change. In 2019, we made great progress in building upon our previous work, launching 3 initiatives, workshopping 6 others, and generating a pipeline of emerging initiatives at the formative or horizon-scanning stage. Each endeavor has been designed to produce cutting-edge scientific insights and, when fully implemented and leveraged, have transformative impacts on conservation policy, practice, and investment.

In aggregate, by 2025, we aspire to identify the key species and geographies that must be conserved or restored to provide the nature that humanity requires for a prosperous future. Over the same timeframe, we will identify and support the strategies with the greatest potential for rapidly conserving and restoring these species and ecosystems at scale. Lastly, we will rigorously evaluate the effectiveness and cost-effectiveness of the billions invested in natural climate solutions and other conservation strategies, steering existing investments and catalyzing new investments in proven, cost-effective approaches.



2019 BREAKTHROUGHS

AMAZONIA FIRE ANALYSIS

PROTECTED AREA ROLLBACKS

WILDLIFE INSIGHTS

SOCIAL IMPACTS OF PROTECTED AREAS

CATALYZING CONSERVATION AT SCALE



AMAZONIA FIRES ANALYSIS

44%

more fire
detections in
2019 compared
to 2018

33%

of fire detections are
in the agricultural-
forest frontiers

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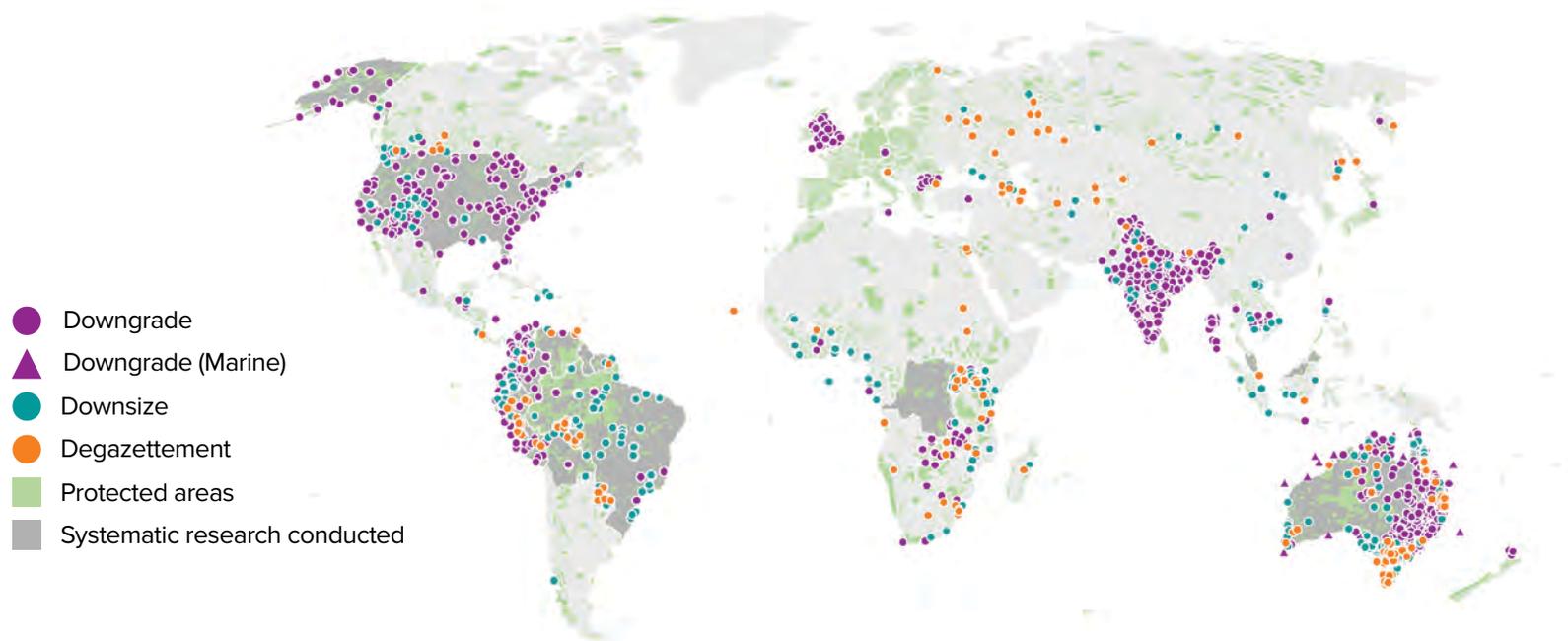
The recent fires across the Amazon threatened an estimated 34 million people, critical nature, and our global climate. By integrating our foundational datasets on deforestation, governance, and commodity supply chains with near real-time fire updates from our early warning system, Firecast, we generated a rapid, holistic Amazon-wide picture of fire status and trends, context, and the key actors involved. This information and insights shaped CI's response and outreach to our partners and the public.



TRACK THE DATA

We have now launched the *Alliance for Brazil*, which is accelerating support in 4 key areas: restoring forests; empowering indigenous groups who have sovereignty over much of the forest; improving fire management capabilities through Firecast; and updating farming techniques to avoid further deforestation. Our efforts culminated at the United Nations Climate Week in New York in September, where President Macron announced a \$100 million commitment from France for the protection of the Amazon. Our analysis of the Amazon fire crisis illustrates the critical role that science plays in helping us understand and combat the environmental challenges we face everywhere that we work.

PROTECTED AREA ROLLBACKS



Protected areas are the cornerstone of conservation, but are often subject to legal changes that temper restrictions, shrink boundaries, or eliminate protections. These legal changes are known as protected area downgrading, downsizing, and degazettement (PADD) events.

In the first half of 2019, we significantly advanced scientific understanding of PADD through the publication of two peer-reviewed manuscripts: one in *Science*, and the other in *Conservation Biology*. Through these studies, we demonstrated that PADD has been enacted or proposed more than 4,000 times in 76 countries. PADD is largely related to industrial-scale natural resource extraction and development, and is accelerating—even

affecting iconic UNESCO World Heritage Sites. As the global leaders in this field of study, we continue to share our research directly with key influencers through scientific presentations, interactive web content and media. In 2020, we will submit three additional manuscripts for publication: delineating methodologies to collect and analyze PADD data, and another to assess the contributions of PADD to global conservation targets, and a third that identifies PADD in marine protected areas. We are committed to maintaining and growing this foundational dataset, which will serve as a core component of a new initiative to integrate governance data into a comprehensive global Conservation Atlas.



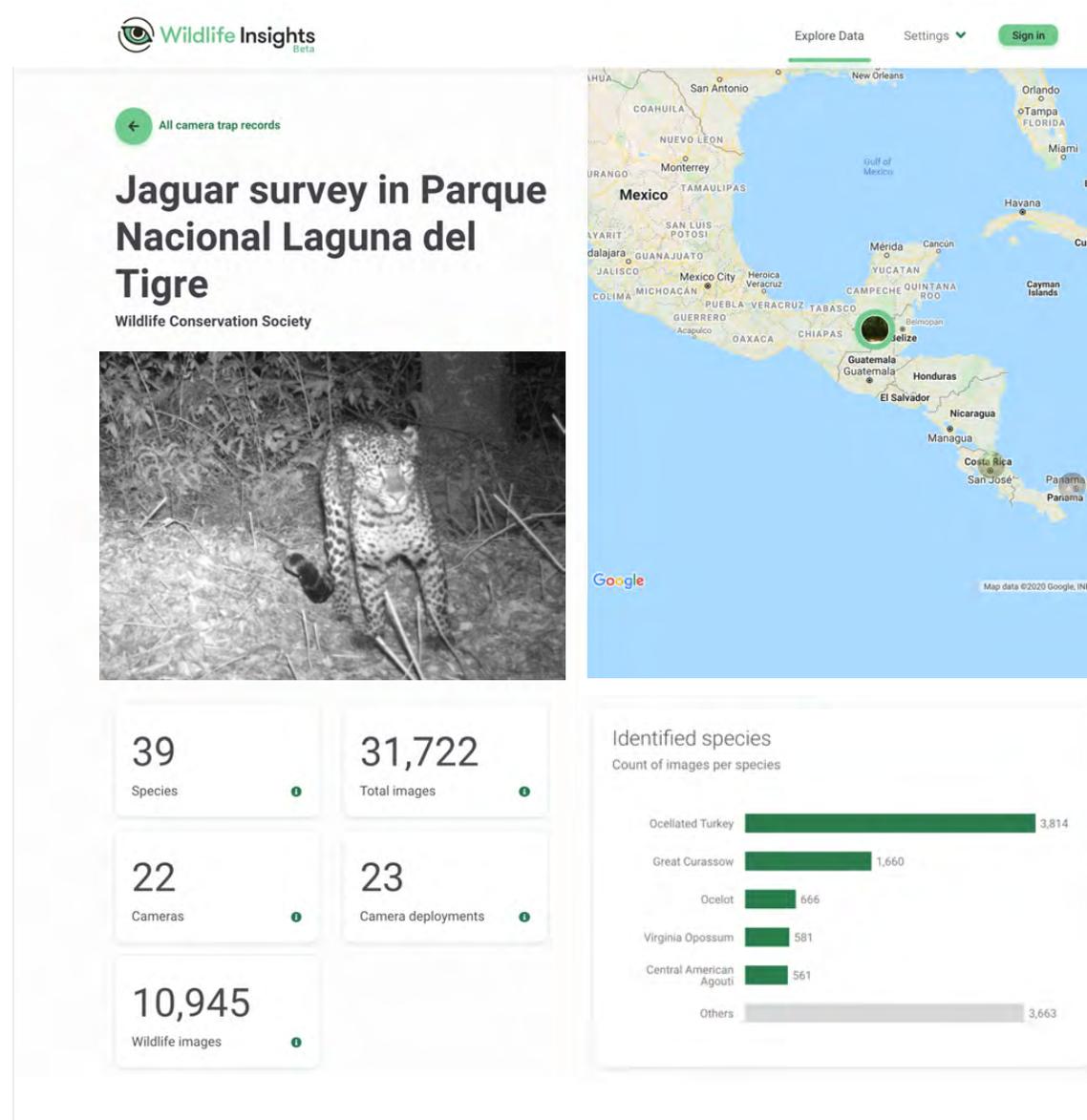
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WILDLIFE INSIGHTS

Wildlife is an essential component of all ecosystems, yet most decisionmakers lack the timely information required for evidence-based wildlife management. To empower these decisionmakers, CI and partners (Wildlife Conservation Society, World Wildlife Fund, Yale University, Zoological Society of London, North Carolina Museum of Natural Sciences, Smithsonian Institution and Google) have developed Wildlife Insights, a near-real-time wildlife monitoring system with the ability to identify and monitor over 600 species globally – a number that grows daily.

Launched in 2019, Wildlife Insights transforms camera trap images to actionable information through artificial intelligence, data sharing, and rigorous analytics. As the main technical private sector partner, Google has played a key role in developing artificial intelligence models to dramatically increase (> 10X) the speed at which camera trap images are identified and processed, as well as providing essential cloud infrastructure and computing power. In the next five years, we will catalyze evidence-based wildlife management in 3,000 of the world's largest protected areas – an area more than $\frac{2}{3}$ the size of the continental United States – through real-time data on wildlife populations.

 [READ THE FULL STORY](#)



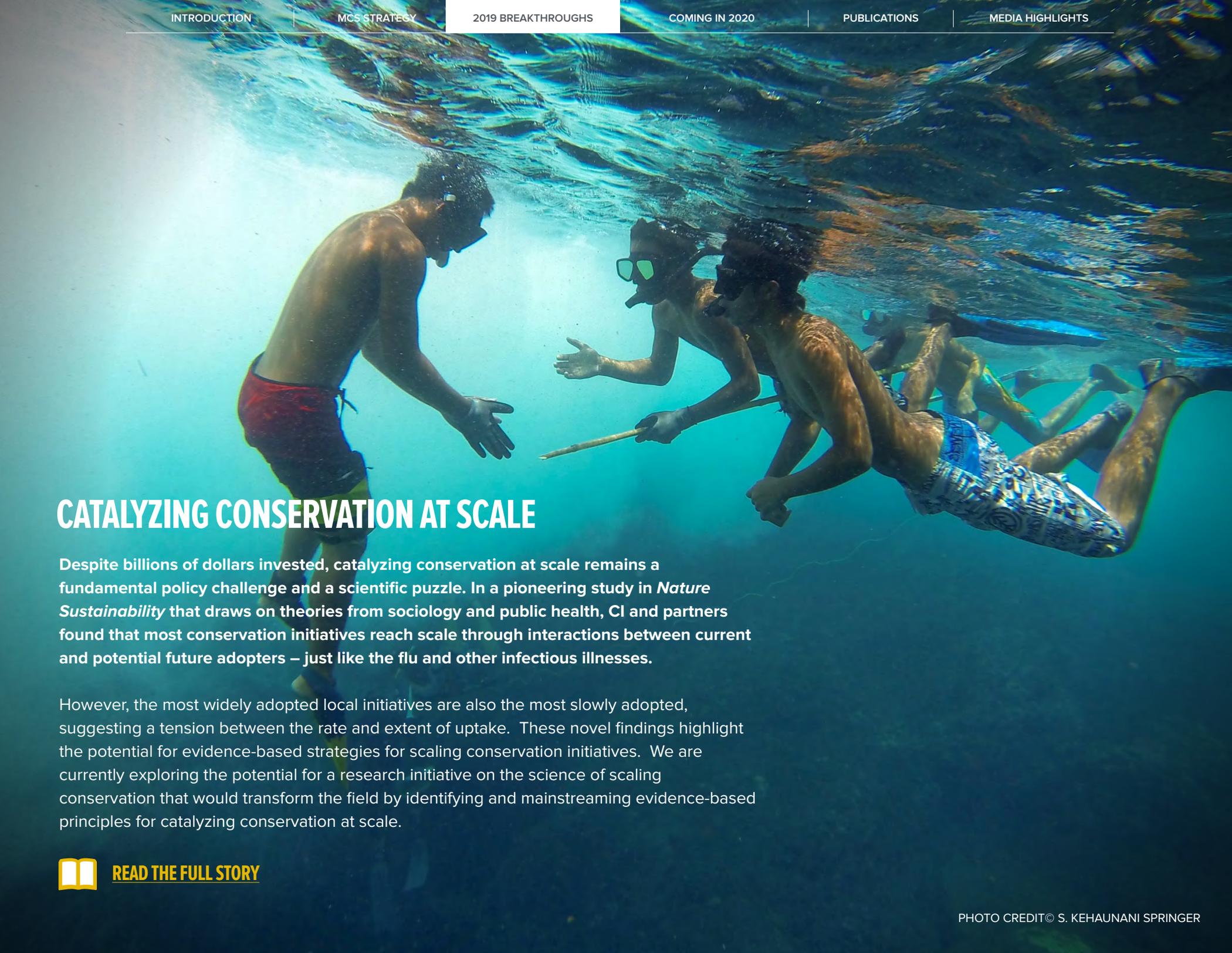
SOCIAL IMPACTS OF PROTECTED AREAS

Poverty and malnutrition are recurring challenges for rural people across the tropics, but the benefits of nature conservation to human well-being are poorly documented and highly contested.

In the largest study of its kind, Conservation International and partners reported in *Science Advances* that living near a multi-use protected area with tourism significantly enhanced household wealth, reduced poverty and child stunting. These positive impacts are on par with more traditional international development strategies (e.g., education, rural-to-urban relocation), highlighting the critical role of nature conservation in national development policies. We are now initiating a parallel study to examine the health impacts of marine protected areas, as part of a broader exploration of the potential for a research initiative at the nexus of conservation, health, and climate change.

 [READ THE FULL STORY](#)





CATALYZING CONSERVATION AT SCALE

Despite billions of dollars invested, catalyzing conservation at scale remains a fundamental policy challenge and a scientific puzzle. In a pioneering study in *Nature Sustainability* that draws on theories from sociology and public health, CI and partners found that most conservation initiatives reach scale through interactions between current and potential future adopters – just like the flu and other infectious illnesses.

However, the most widely adopted local initiatives are also the most slowly adopted, suggesting a tension between the rate and extent of uptake. These novel findings highlight the potential for evidence-based strategies for scaling conservation initiatives. We are currently exploring the potential for a research initiative on the science of scaling conservation that would transform the field by identifying and mainstreaming evidence-based principles for catalyzing conservation at scale.



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COMING IN 2020

COMING IN 2020

Looking ahead, we will continue our investment in cutting-edge research designed to transform conservation policy and practice globally. Here are four Science initiatives to track in 2020.



Critical Natural Capital

We will map global critical natural capital to enhance the evidence base for conservation policy and foster better alignment with the sustainable development agenda. The work will be validated through publication in high-impact scientific journals, and decisionmakers will be engaged at both the 'scape and global scales to ensure the achievement of conservation actions are both just and lasting.



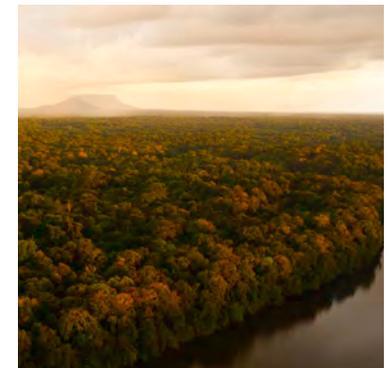
Climate Irreplaceable Ecosystems

We will establish the scientific imperative for protecting Climate Irreplaceable Ecosystems, which are places on Earth so rich in irrecoverable carbon they must be conserved to avoid catastrophic climate change. We will publish our work in a high-impact scientific journal along with a global map of priority ecosystems for conservation action and investment.



An Exponential Roadmap for Natural Climate Solutions

We will publish a science-based, policy and actor-focused roadmap, that describes the pathways by which nature can fulfill its promise as a strategy for mitigating climate change globally and work with national governments to put this roadmap into practice in support of the Paris Climate Agreement.



Impact Evaluation of Natural Climate Solutions

We will launch of a game-changing partnership with JPAL-MIT to identify the most cost-effective nature-based strategies for mitigating climate change. Through a series of studies, researchers around the world will measure humanity's progress, foster learning, and ensure accountability for actions to reverse the climate crisis.

2019 PUBLICATIONS

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51

published
peer-reviewed
articles

27

additional manuscripts
currently in preparation
or under review

15+

 million

people reached through
social media



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TO READ THE MOORE
CENTER FOR SCIENCE
2019 ANNUAL REVIEW &
EXPLORE LAST YEAR'S
SCIENCE PUBLICATIONS

2019 MEDIA HIGHLIGHTS

Our groundbreaking conservation research attracts the attention of news outlets around the world. The following handful of stories are among the dozens published about our work in 2019, including influential outlets such as *The New York Times*, *The Guardian*, *Rolling Stone*, and *The New Yorker*.

1. **US Rollback of Protected Areas Risks Emboldening Others, Scientists Warn**
The Guardian
2. **U.S. Sees Largest Reduction of Protected Lands in History Under Trump**
Rolling Stone
3. **National Parks: Serving Humanity's Well-being as Much as Nature's**
Mongabay
4. **Deep in the Honduran Rain Forest, an Ecological SWAT Team Explores a Lost World**
The New Yorker
5. **Companies See Climate Change Hitting Their Bottom Lines in the Next 5 Years**
The New York Times
6. **Google Cloud AI Platform updates make it faster and more flexible**
AI News



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