

A MESSAGE FROM A TNC GLOBAL BOARD MEMBER

Dear Friends,

2024 was a fantastic year for science at The Nature Conservancy (TNC). Now in its second year, the One Conservancy Science Program continues to expand its reach, strengthening our science and increasing its visibility both within TNC and beyond.

I was honored to be invited to chair TNC's first-ever Council of External Science Advisors. This distinguished group of experts, spanning a range of disciplines, geographies, and sectors, will provide the independent, high-level guidance that ensures our science remains at the forefront of innovation. Their insights will help shape the next phase of our science program and serve as an essential resource for our science leadership and staff worldwide.

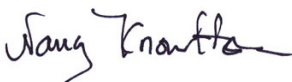
The year culminated in the One Conservancy Science Gathering in November, which I had the pleasure of attending along with my fellow Global Board Member, Kent Thiry and our Board Chair, Senator Bill Frist. To me, the Gathering exemplified the best of science at TNC: collaborative, interdisciplinary, diverse, innovative, and above all, driven by passion. I especially enjoyed hearing about our

conservation successes and listening to our scientists grapple with decisions about how to move forward. I even met a much-esteemed colleague who I was surprised and excited to learn is now part of the TNC science family. It was a unique opportunity to witness and help amplify the growing reach and scale of our science teams around the world. I think we all left collectively more excited about science than ever!

This 2024 annual report highlights many of the remarkable achievements of TNC's scientists and partners as we work towards our 2030 goals. Yet, as the Gathering demonstrated, this is only a glimpse of the incredible science work happening across TNC worldwide.

To all our scientists and science staff—thank you for your dedication, innovation, and impact.

Sincerely,



Nancy Knowlton, TNC Global Board Member, Sant Chair in Marine Science Emerita, Smithsonian National Museum of Natural History



2030 Goals



People



Climate Mitigation



Lands



Freshwater



Oceans



Climate Adaptation

COVER A team of scientists, netting fish caught via electric fishing, as part of an effort to map species in rivers that might be dammed. © Roshni Lodhia THIS PAGE Hide and seek Raccoon. © Jon Burket/TNC Photo Contest 2021 INSET © Eva Lepiz



LETTER FROM THE CHIEF SCIENTIST

Dear Colleagues,

TNC's One Conservancy Science Program (OCSF) is only two years old, and it's already delivering on its mission: connecting our more than 1,000 scientists and science staff across the globe to optimize science and innovation, amplifying research impact, and building capacity to accelerate us toward our 2030 goals.

2024 was a year of many milestones. We launched a program to amplify the voices of science staff in low- and middle-income countries, piloted three Science Coda Teams, and established a new Council of External Science Advisors. We provided access to more than 24,000 journals, created a new internal knowledge bank, and kicked off TNC Science on LinkedIn. But the highlight of the year was the One Conservancy Science Gathering in November 2024: OCSF in action, brought to life.

The Gathering underscored the profound impact of science on conservation and climate strategies both within TNC and across the many peer institutions who attended. What resonated most, though, was the recurring theme of love. From our opening plenary speakers, Kyle Whyte and Xiye Bastida, to the closing award ceremony, speaker after speaker—science staff and leadership alike—shared how love powers all our work: love of place, love of people, and love of nature. By connecting their head, heart, and hands, scientists can transform knowledge into meaningful solutions to the world's most pressing problems.

Looking ahead to 2025, we are excited to launch a new post-doc program with the Smithsonian Institution; expand our knowledge in planetary and human health and the Indigenous Sciences; develop our work in artificial intelligence and machine learning to enhance science knowledge and access; and introduce a public webinar series and a TNC Science Bluesky account to share our insights more broadly. Stay connected by signing up for our monthly newsletter.

Yours,



Katharine Hayhoe, TNC Chief Scientist

“Love and feelings are not typically associated with science or scientists. But I deeply appreciated the [One Conservancy Science] gathering with TNC scientists from around the world where LOVE was a message echoed throughout so many conversations.”

– Max Lambert,
Director of Science, TNC Washington



EVENT

One Conservancy Science Gathering

The One Conservancy Science Gathering (OCSG) took place from November 11 – 15, 2024, in Mexico City. This event brought together TNC science and conservation practitioners from around the world for a week packed with cutting-edge science, networking, professional development, and cultural exchanges.

OCSG by the numbers:

- **Welcomed 508 participants:** 464 attended in person and 44 joined virtually.
- **Represented global participants:** 32 countries, 75 business units, and nearly three dozen peer conservation, environmental, academic, and research institutions.
- **Invested in new leaders:** 38% of attendees were early-career-stage scientists and 53% were mid-career.

- **Ensured inclusion:** \$192,336 USD in stipends were awarded to 56 participants from 23 countries and territories to support their travel and participation.
- **Provided a platform:** Over half of the in-person attendees had a presenting role—that's over 230 speakers!
- **Included a packed agenda:** 42 working sessions, 120 science talks, 19 digital posters, 18 lightning talks, and 11 science capacity sessions.
- **Demonstrated a true team effort:** Over 100 staff across 10 working groups volunteered their time to planning and executing the event: from science content, review panels, and professional development to social activities, logistics and AV, on-site registration, and more.

The spirit of One Conservancy Science was on full display throughout the week, demonstrating the power of collaboration, knowledge-sharing, and innovation in advancing our global conservation goals. Knowledge sharing from this event is being curated and shared broadly with the organization for learning beyond the Gathering. 95% of attendees reported making new connections at the event. Participants shared their experiences:

"I was aware that TNC was a science-based organization, but I only truly grasped its richness during this OCSG. It's impressive to realize that, as a TNC staff member, I have access to so many scientists and brilliant minds."

"Thank you so much for bringing us together and promoting such a kind, collaborative, and useful Gathering. Every session and talk had a beautiful balance of strong science and usefulness for practical application and needs of partners. An amazing week."

"In my 15 years at TNC, this has been one of the most enriching processes I've experienced. The Gathering offered many opportunities that help us work better and plan more effectively for the tasks we undertake."

**"The best
well-organized
global event [I've]
attended since joining
TNC decades ago."**

LEFT TO RIGHT Attendees at the OCS Gathering in Mexico City.; TNC CEO Jen Morris in a fireside chat with Chief Scientist Katharine Hayhoe at the OCS Gathering. © Juan Carlos Valdez Dragonné



Spotlight on TNC Mexico Science: Co-Creating a Decision-Making Tool for Fish Refugia Design

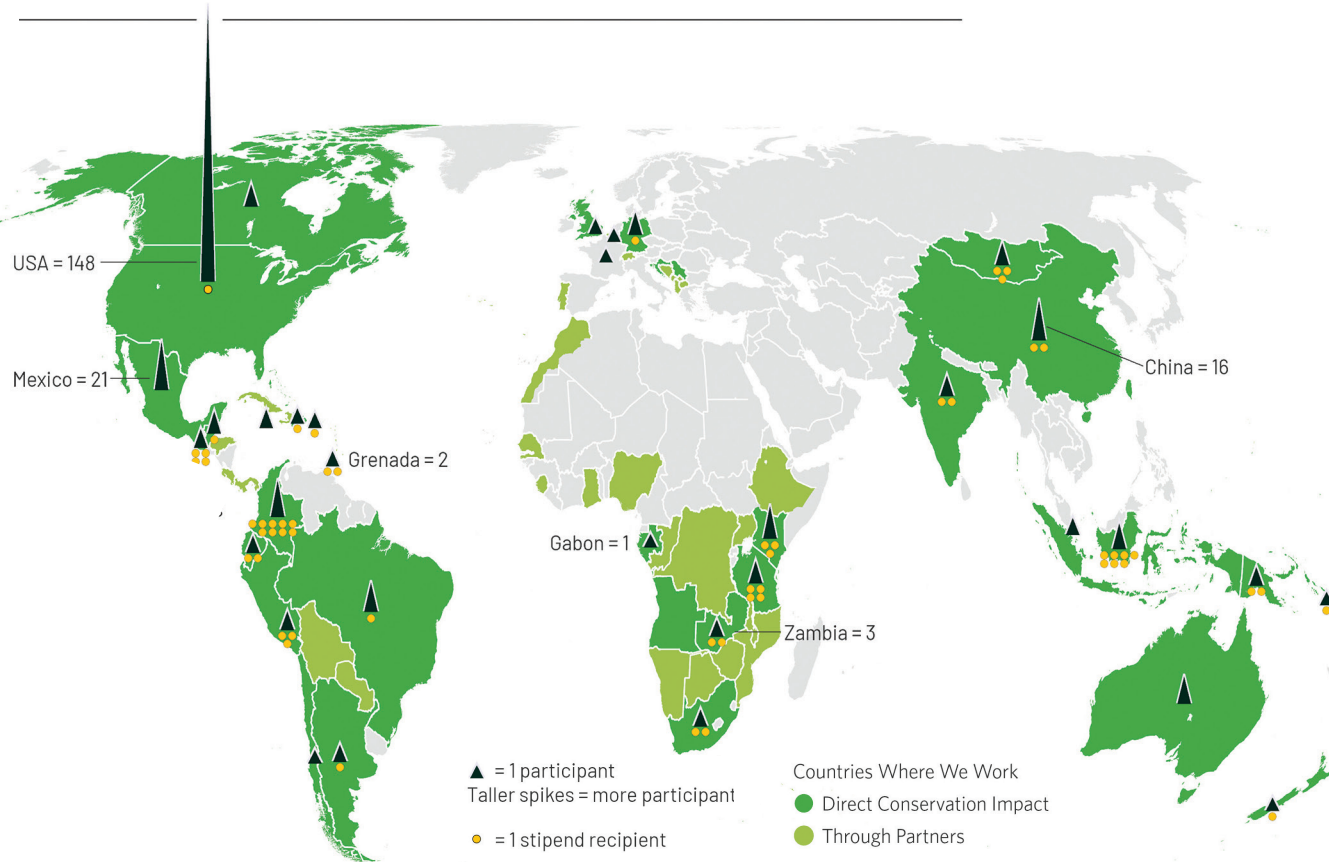
To address the urgent challenges facing Mexico's marine biodiversity - overfishing, habitat loss, and climate change - working with the Mexican Institute for Research in Fisheries and Sustainable Aquaculture (IMIPAS) and other partners, TNC developed a participatory tool for designing Fish Refugia. Unlike permanent protected areas, these dynamic, community-driven (bottom-up) fisheries management tools are temporary and adaptable to local needs.

This [geoportal](#) integrates scientific data with local expertise to optimize Fish Refugia size, shape, and location to maximize fisheries replenishment. Through workshops, pilot tests, and stakeholder engagement, it fosters trust, transparency, and informed decision-making. Early results highlight the importance of data accessibility for adoption by fishers and policymakers.

This platform is being institutionalized within IMIPAS to officially support Fish Refugia initiatives across Mexico. By combining science, technology, and community participation, this approach is redefining fisheries management in Mexico.

OCSG Participants Data

Participants by Country | One Conservancy Science Gathering 2024



Note: Hong Kong and Taiwan are added to China participant numbers.

2024 HIGHLIGHTS

The **One Conservancy Science Program** (OCS) serves TNC's 1,000 science staff, including **475+** practicing scientists, **300+** non-practicing scientists, and **175+** science support staff.

It provides a range of programs focused on: communication and connection (blue), scientific expertise (orange), research support (green), scientific capacity-building (purple), and science insights (red).

At the heart of the OCS is the Global Science team. Its scientists and staff are responsible for developing, coordinating, and providing the essential programs, resources, and expertise needed to achieve our shared mission.

OCS's four key pillars guide our targeted science investment, development, and support to strengthen and grow a

world-class science program through:

1. **Building our connectivity** by strengthening collaborations and connections across the organization and beyond
2. **Honing our focus** on our ambitious 2030 goals
3. **Filling our gaps** in scientific knowledge, expertise and research
4. **Ensuring our consistency** as a cohesive, high-impact science community



2024 OCS At A Glance:

374

2024 Publications authored or co-authored by TNC staff

18,549

of Downloads from TNC E-Collection (journal access)

\$1.65M

\$ Delivered by OCS to Business Units:

- 2030 Science Catalyst Fund ("rapid response" research): **\$855K**
- FinishLine Fund (publishing support): **\$122K**
- Science Coda Program: **\$91K**
- SNAPP (funds multidisciplinary working groups): **\$562K**
- Mentor Program: **\$18K**

105

of Business Units directly served by OCS:

- 2030 Science Catalyst Fund: **8**
- FinishLine Fund: **16**
- Science Coda Program: **3**
- SNAPP Working Groups: **9**
- Mentor Program: **35**
- Science Trainings: **34**

800+

of Participants in OCS Programming:

- Science Coda Program: **11**
- SNAPP Working Groups: **185**
- Mentor Program: **46**
- Science Trainings: **59**
- Gathering Attendees: **508**



SNAPP 10-Year Anniversary

In 2024, Science for Nature and People Partnership (SNAPP) celebrated 10 years of success. SNAPP Working Groups bring together transdisciplinary teams to use existing data to solve problems quickly.

For example, in 2024, a group led by Patricia Mupeta-Muyama (TNC), Brian Child (University of Florida), and Rodgers Lubilo (Community Leaders Network of Southern Africa) used data from community-based natural resource management areas across seven African countries to discover

why communities often distrust conservation efforts. This work galvanized funding from the Global Environmental Fund's Fonseca Leadership Program to support master's degrees in conservation leadership for 15 African scholars at Stellenbosch University in South Africa.

In 2025, SNAPP launched a new partnership with the Doris Duke Foundation. It will fund three interdisciplinary working groups to strengthen the evidence for, and create a roadmap to implement, a shared vision for a nature-positive future in the United States. For more SNAPP highlights, check out this blog and video.

FinishLine Fund: Supporting Science Publications

To help increase the profile of our science, the FinishLine Fund provides flexible funds for scientists to publish the results of their research in peer-reviewed journals. In 2024, the FinishLine Fund supported 17 new publications. Of the 11 that have been published to date, most are in journals in the top quartile of their subject category. They include 53 co-authors, including 22 TNC co-authors, from multiple institutions and countries.

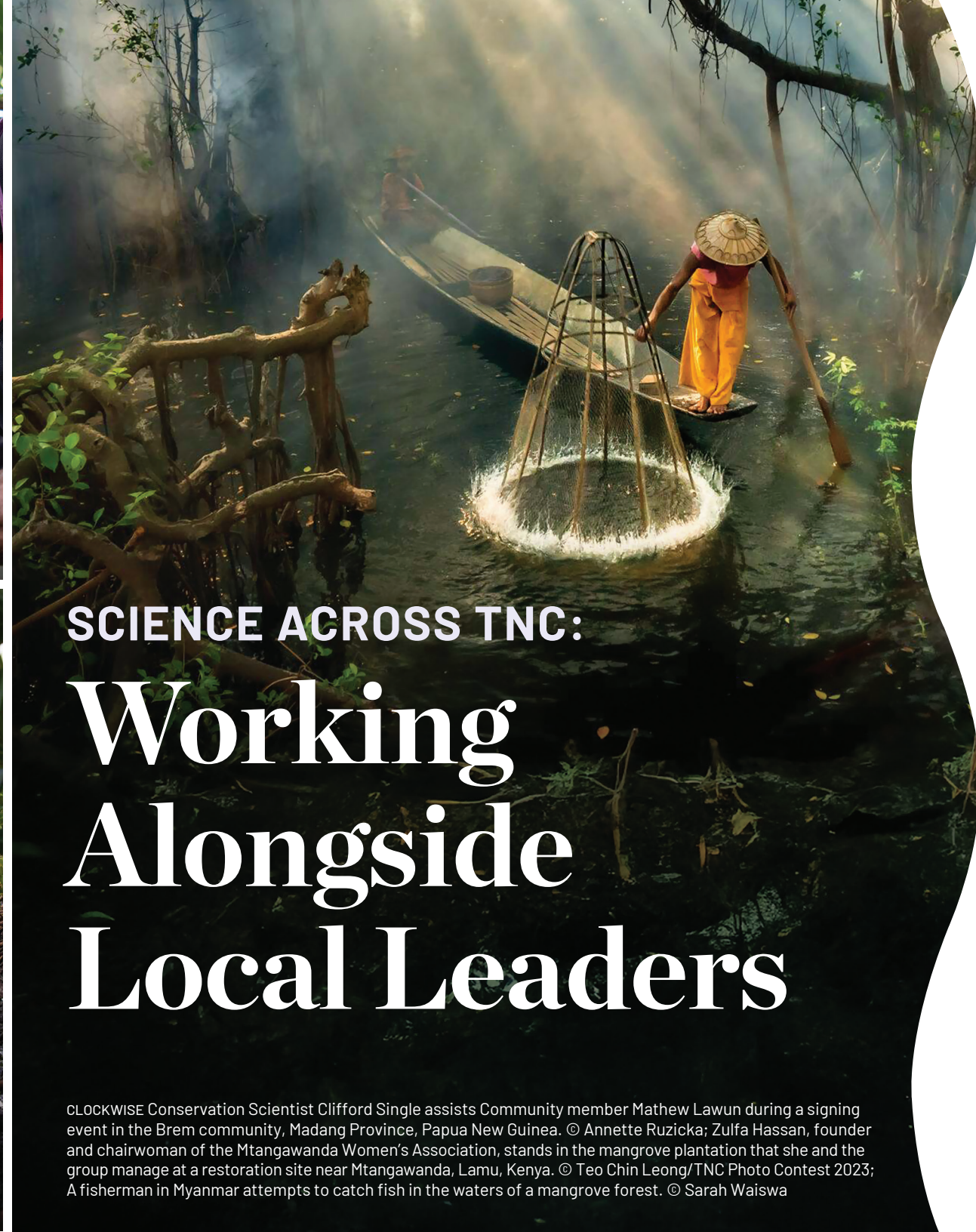
Science Catalyst Fund Projects Informing Policy

TNC's 2030 Science Catalyst Fund supports urgent, "rapid-response" research to inform decisions on TNC projects and strategies aimed at achieving our 2030 goals. Six inaugural project teams completed their Catalyst-funded research in 2024. While policy impacts can often take years, five out of six Catalyst projects have already influenced policy or government actions—truly catalyzing change across the globe!

For example:

- In China, the Ministry of Agriculture and Rural Affairs (MARA) published farming guidance based on a TNC Catalyst project on regenerative agriculture and soil health. TNC is now collaborating with MARA, scientific academies, and ag-food enterprises to integrate soil health into China's next five-year national plan.

- In the U.S. mid-Atlantic, a seabird tracking study assessing risks from offshore wind development informed siting letters submitted by TNC and partners to the U.S. Bureau of Ocean Energy Management (BOEM). The study's methods have already attracted interest from the U.S. National Oceanic and Atmospheric Administration (NOAA) and other TNC teams, with further applications expected as new data comes in.



SCIENCE ACROSS TNC: Working Alongside Local Leaders

CLOCKWISE Conservation Scientist Clifford Single assists Community member Mathew Lawun during a signing event in the Brem community, Madang Province, Papua New Guinea. © Annette Ruzicka; Zulfa Hassan, founder and chairwoman of the Mtangawanda Women's Association, stands in the mangrove plantation that she and the group manage at a restoration site near Mtangawanda, Lamu, Kenya. © Teo Chin Leong/TNC Photo Contest 2023; A fisherman in Myanmar attempts to catch fish in the waters of a mangrove forest. © Sarah Waiswa

Enhancing Conservation with Traditional and Local Ecological Knowledge

For effective conservation and restoration, it's essential to engage with knowledge held by Indigenous Peoples and traditional communities. Traditional ecological knowledge and local ecological knowledge (LEK) provide critical insights into local ecological and social context. LEK, gained through extensive personal observation of and interaction with local ecosystems, often yields new insights that enhance long-term outcomes. Conservation efforts are increasingly focusing on rights and equity as well, with the [Global Biodiversity Framework](#) recognizing the important role that Indigenous Peoples and traditional communities play in conservation more than any previous international framework.

Ethical, participatory research involving Indigenous Peoples and traditional communities requires skills not traditionally taught in Western conservation science programs. As scientists and practitioners increasingly co-produce knowledge with Indigenous Peoples, clear guidance and information on best practices is essential. A [new paper](#) by researchers

working with Indigenous Peoples and traditional communities explores three key themes in conservation research involving these communities: participation across different stages of research; data collection methods and their strengths and limitations; and ethical considerations related to participation of Indigenous Peoples and traditional communities. They outline 14 core principles to help integrate equity into conservation research.

Similarly, TNC and [The Global Mangrove Alliance](#) released [Including Local Ecological Knowledge in Mangrove Conservation & Restoration](#), a guide to help mangrove researchers and practitioners incorporate LEK into their projects. It highlights the value of LEK alongside existing ecological, economic, and social science data and includes over 20 case studies and best practices from around the world. In Kenya, a mangrove restoration project sought to 1) protect fisheries critical to local communities by restoring degraded areas, and 2) promote sustainable alternative livelihoods. The team combined local and technical scientific

knowledge to plan and implement the project. Local knowledge included insights to navigate through the ecosystem, drivers of ecosystem change guided by elders' first-hand experiences, and mangrove reproductive dynamics. Integrating Indigenous knowledge with Western science before planting improved survival rates to approximately 95%. Additionally, women from the community now generate income by selling seedlings to the project—yet another win.



➤ 2030 GOAL

Support the leadership of **45 million people** whose lives depend on nature every day.

Other 2030 Goals Met by this Project



Climate Mitigation



Climate Adaptation

Integrating Indigenous knowledge with Western science before planting improved survival rates to approximately 95%.



NEW RESEARCH DIRECTIONS

Miguel Sioui Leading New Indigenous Sciences Program

TNC is committed to diverse knowledge systems and ways of knowing. To that end, [Dr. Miguel Sioui](#) joined TNC as the Global Director of Indigenous Sciences in late 2024. In this groundbreaking new position, Miguel will develop, lead, and promote scientific research grounded in Indigenous frameworks—such as [Two-Eyed Seeing](#)—while amplifying Indigenous and local knowledge systems and methodologies.

With 15 years of community-based work with Indigenous communities in the Yucatan, the Canadian Subarctic, and the Sami territories in

Northern Finland, Miguel is a passionate Indigenous land and water stewardship researcher dedicated to weaving Indigenous knowledge systems with Western scientific approaches. His work highlights Indigenous stewardship practices and their critical role as stewards of the land since time immemorial.

Through his work, Miguel seeks to elevate Indigenous voices in environmental governance, ensuring that their knowledge systems are not only preserved but also actively shape the future of environmental policy and practice.

Miguel shares that: *“Joining TNC at this moment feels like a natural progression of my journey, and TNC’s commitment to integrating Indigenous knowledge systems into environmental conservation aligns perfectly with my vision. I’m excited to contribute to a global platform that values and uplifts the wisdom of Indigenous communities, ensuring that their voices are heard and respected in the global policy arena.”*



OCSPP Impact Spotlight: Empowering Global Voices

Launched in 2024 by a generous gift from TNC Global Board Member John Bernstein, the Empowering Global Voices (EGV) program amplifies the voices of science staff in low-and middle-income countries. The program addresses publishing disparities by providing funded writing time, mentoring, writing retreats, and more. The first EGV cohort included 11 participants—all non-native English speakers from 10 different countries across Africa, Asia, and Latin America.

Hilda Lionata, Ocean Program Senior Manager for Yayasan Konservasi Alam Nusantara (YKAN) - TNC Indonesia and a participant of the inaugural EGV cohort, recently had her first paper accepted by the *Bulletin of Marine Science*. With over 15 years of experience in conservation and community

development, Hilda is working to advance gender equity in ocean conservation and livelihoods in Indonesia. Her research explores how women in traditional patriarchal systems face barriers such as unequal access to resources and limited decision-making power. In a groundbreaking initiative, a women's group in West Papua, Waifuna, successfully managed a *sasi*—a 400-year-old forest or marine resource management practice historically led by men. Her paper, “Women Managers, Local Wisdom, and Customary Practice in Marine Conservation, Raja Ampat, Papua,” highlights how this group overcame challenges, reshaped community perceptions, and expanded their roles in conservation and decision-making.

Mengjiao Li, another first-year participant and Senior Project Officer at TNC-China, published her first paper, “Social and cultural aspects of

human-wildlife conflicts: Understanding people's attitudes to crop-raiding animals and other wildlife in agricultural systems of the Tibetan Plateau” in *Integrative Conservation*. The team determined that the *likability* of certain animals played a significant role in shaping farmers' tolerance of crop raiding. Many of these animals hold high local cultural importance. These wildlife preferences were even more influential than the amount of cropland damage caused by the animals. The research underscores the importance of incorporating cultural considerations to fully address the complex human dimensions inherent in conservation.

More papers are expected from scientists in the first cohort in the coming year, and a second cohort will launch in 2025.



OCSP Impact Spotlight: Science Coda Teams

In 2024, TNC launched a Science Coda Teams pilot. The Science Coda Program connects TNC business units in need of scientific support with small, interdisciplinary teams of TNC scientists from across the organization. In the pilot, the OCSP funded three projects, each supporting part-time work for a team of 2-5 scientists, and all resulting in tangible, usable science products:

- **Africa:** Created a custom data Dashboard for the Africa Program, illustrating conservation program metrics in real-time and creating a centralized reporting platform in the process.

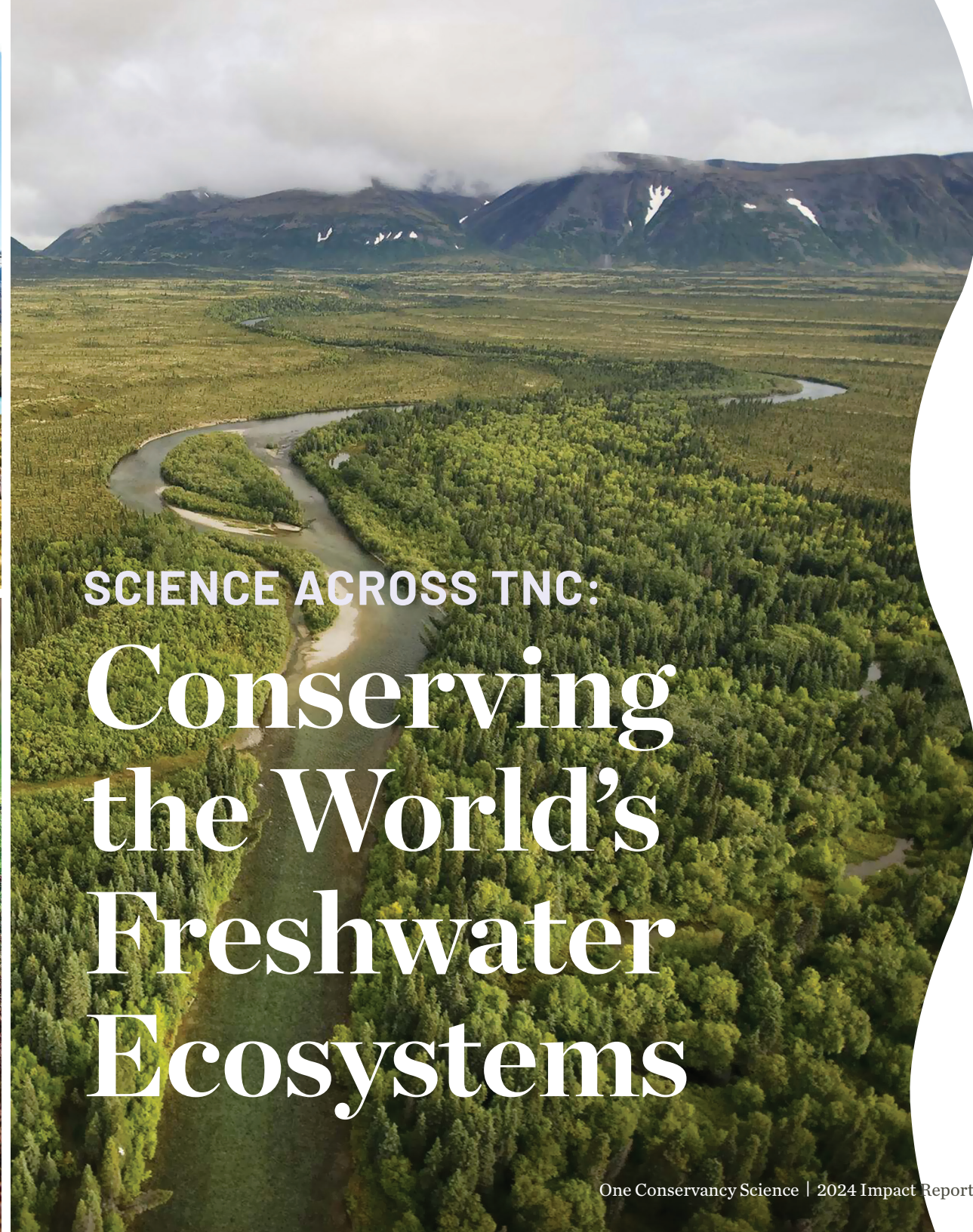
Impact: Improved decision-making efficiency, enhanced monitoring and evaluation processes, and improved transparency and accountability.

- **U.S. Great Plains:** Researched buffalo rematriation impacts from a holistic perspective to inform a draft management plan framework and recommendations for future buffalo management trainings. **Impact:** Progress towards a longer journey of communicating the interconnected impacts of buffalo rematriation, and time and space to reflect on TNC's buffalo management learnings over the years.
- **Latin America:** Developed a spatial analysis to identify and map Colombian peatlands. **Impact:** Direct transfer of knowledge in spatial

data modeling and increased understanding of the carbon mitigation potential of Colombian peatlands allowing for stronger advocacy efforts in securing protection for these vital ecosystems.

The pilot achieved an impressive satisfaction rate of 100%, based on responses from the scientists and project hosts.

"The program has significantly contributed to our professional development. We've gained valuable skills to advocate for Indigenous-led science and knowledge, expanded our relationships within TNC and beyond, and deepened our understanding of buffalo stewardship." Oliva Schouten and Brett Perkins (2024 Science Coda Teams Fellows)



SCIENCE ACROSS TNC:

Conserving the World's Freshwater Ecosystems

CLOCKWISE Glacial lagoons beneath peaks and glaciers in the Cordillera Huayhuash, Peru. © Kevin Wells/TNC Photo Contest 2019; An aerial view of the Bristol Bay watershed in southwest Alaska. An impact study is being conducted to focus attention on the value of this fragile ecosystem and vital salmon spawning habitat. © Bridget Besaw; Groundwater source in west Texas. © Jerod Foster

Advancing Technology Improves Freshwater Protection & Management

Mapping groundwater-dependent ecosystems.

Groundwater-dependent ecosystems are often hotspots for biodiversity—but many of their locations were still unknown. As climate change and water use are rapidly depleting groundwater around the world, it's becoming increasingly crucial for scientists and policymakers to track impacts and implement protective policies and conservation measures.

A team led by TNC and the [Desert Research Institute](#) in Nevada [created](#) the first [global map](#) of groundwater-dependent ecosystems in drylands, identifying their locations, protections, and overlap with communities. Using satellite imagery and 30,000 confirmed data points, the team [trained](#) a computer model to identify sources as small as a swimming pool—a crucial step, as these small sources are often the most critical to people, plants, and wildlife. Their analysis reveals that over half of these ecosystems are in areas with known groundwater depletion, and less than a quarter are protected — providing essential information to safeguard these important ecosystems and the societies that depend on them.

Improving stormwater management.

Stormwater pollution is a major threat to water quality, and TNC's [Brightstorm Program](#) is tackling the issue using innovative technology. Expanding on the concept of [“smart” stormwater ponds](#), Brightstorm is pioneering a first-of-its-kind [Smart Watershed Network Management](#) system that leverages artificial intelligence (AI) and machine learning (ML).

The project develops open-source software that uses AI/ML to better predict pollution transport, hydraulics, and hydrology under different weather conditions, including future climate impacts. The system networks a series of smart ponds, enabling them to share real-time data and continuously optimize performance for better climate resilience.

Brightstorm is helping public officials make smarter, more cost-effective infrastructure investments, with an initial focus on Florida's Indian River Lagoon—one of North America's most biodiverse estuaries. Working with both private and government partners, the program is already improving water quality and downstream habitat and, long term, could be integrated into watershed planning across the U.S. and beyond.

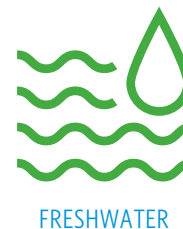


Supporting Inland Waters in Global Biodiversity Framework Implementation

Inland waters—including rivers, lakes, and wetlands—are among the most biodiverse ecosystems

in the world. They are also among the most threatened. With the Global Biodiversity Framework including inland waters in its 30x30 target, a new [IUCN Technical Report](#), led by TNC experts, provides guidance on designing and managing protected and conserved areas to benefit freshwater ecosystems and the biodiversity they support. Through case studies and research, the report shows how integrating inland waters into area-based strategies can improve conservation effectiveness, build climate resilience, and sustain critical ecosystem services.

➤ **2030 GOAL**
Conserve **30 million hectares** of lakes and wetlands and 1 million kilometers of river systems.



Other 2030 Goals
Met by this Project





CLOCKWISE TNC's Bluestem Prairie, considered one of the largest and best northern tallgrass prairies in the US © Richard Hamilton Smith; Solar panels at TNC's demo site outside of Boulder, CO, which aim to use learnings to create a wildlife-friendly solar site. © Dave Lauridsen; Solar Star plant near Rosamond, California. © Joanna Kulesza



SCIENCE ACROSS TNC: Saving Healthy Lands

Safeguarding Land While Advancing the Transition to Clean Energy

As the world shifts to clean energy, innovative solutions are emerging to meet energy demand while protecting nature and communities. The urgency of climate change and environmental degradation make it critical to harness renewable energy in ways that support biodiversity and human well-being.

A 2024 report, [Mining the Sun](#), highlights the potential of building clean energy projects on abandoned mines, landfills, and other brownfields or industrialized lands in the U.S. These sites offer multiple benefits, including generating new revenue streams for local communities, supporting the clean energy transition, and reducing environmental pressure on undisturbed lands. The report provides policymakers with a concise guide, including [resources](#) and recommendations, to make it faster, cheaper, and less risky to develop projects on these sites.

Policy also plays a crucial role in advancing responsible siting and design decisions. In collaboration with SolarPower Europe, TNC

released a landmark [policy paper](#) advocating for EU incentives that reward nature-inclusive solar projects. The [report](#) emphasizes the advantages of integrating conservation into solar design and offers recommendations to scale up these initiatives, including case studies showcasing how solar parks can enhance biodiversity.

At the same time, the clean energy transition is raising concerns over the environmental impacts of lithium mining. A new TNC [study](#), based on previous [collaborative research](#) across nine U.S. states, evaluated these risks by overlaying 72 proposed lithium extraction sites on conservation datasets. The findings reveal significant differences in potential environmental impact, highlighting the need for a “smart from the start” approach that prioritizes extraction at the lowest-impact sites.

By prioritizing underutilized lands, integrating conservation into clean energy projects, and adopting strategic, environmentally conscious resource extraction, we can accelerate the transition to clean energy while safeguarding nature and communities.



Promoting Proactive Conservation Aligned with Global Commitments

Maps and spatial data are critical to successfully implementing conservation strategies that align with global commitments. TNC scientists, working closely with TNC policy teams, use these tools to identify the ecosystems, regions, and countries facing the most urgent conservation challenges.

One such innovation is a global high-resolution (1-km) map of [land conversion pressure](#) that shows where future habitat loss could occur due to renewable energy expansion, oil and gas development, mining, agriculture and urban growth, and more. Identifying these high-risk areas in advance can inform targeted interventions to prevent future loss to nature and to mitigate potential impacts to people.

Previous habitat mapping efforts largely focused on forests and considered only a limited number of threats. This new, more comprehensive approach helps identify areas where conservation efforts should be prioritized, which in turn helps ensure commitments under the Global Biodiversity Framework and Paris Climate Agreement can be upheld.



LANDS

➤ **2030 GOAL**
Conserve **650 million**
hectares of land.

Other 2030
Goals Met by
this Project



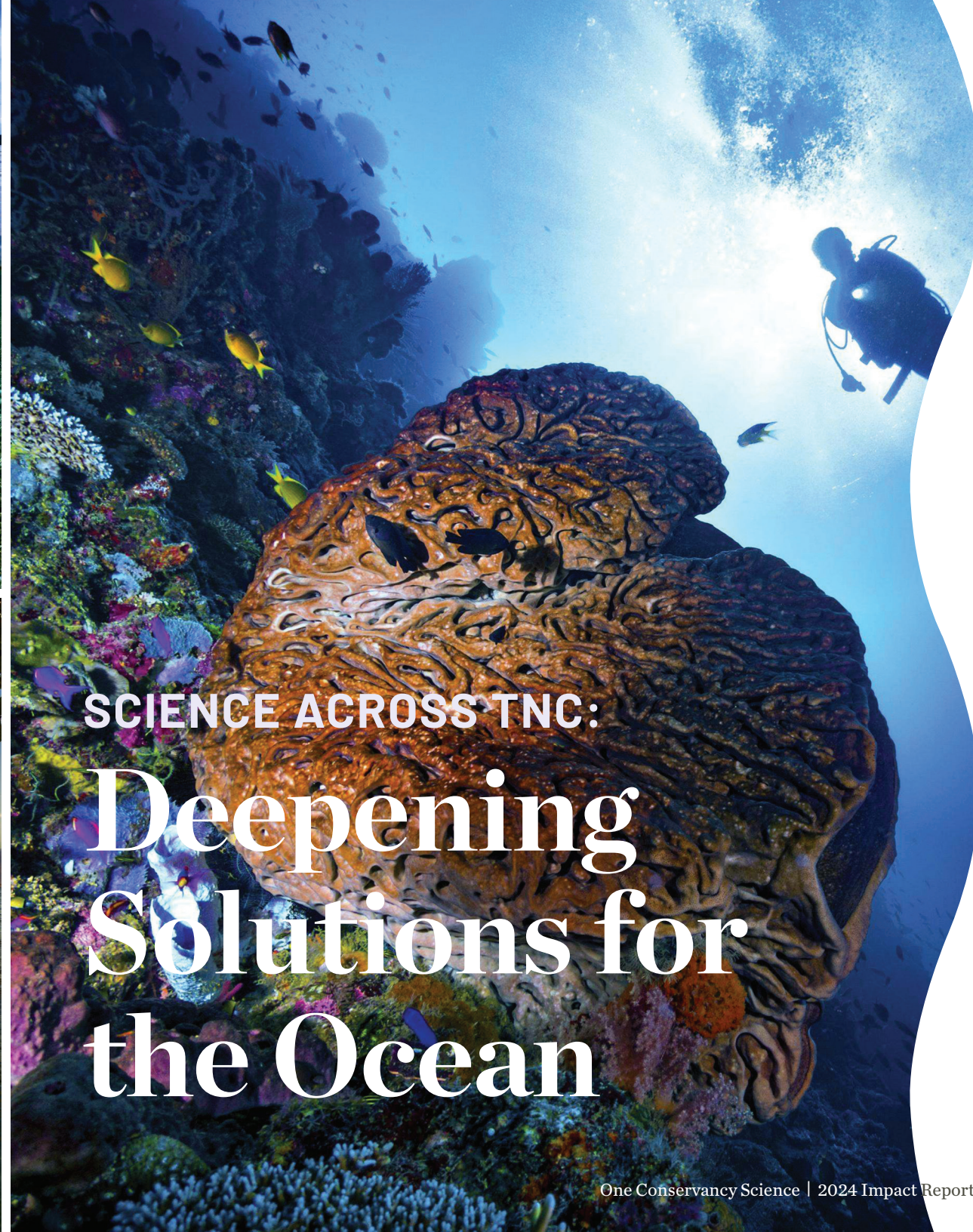
Climate
Mitigation



People



CLOCKWISE View of Choungui mountain from the reef of Tahiti beach Mayotte Indian Ocean. © Serge Melesan/TNC Photo Contest 2022; Swimming in the Indian Ocean in Beau Vallon, Mahé Island's main tourist area, Seychelles. © Purwanto Nugroho/TNC Photo Contest 2019; View of the coral reef of Salvador Dali, Gorontalo, Indonesia. © Jason Houston



SCIENCE ACROSS TNC:

Deepening Solutions for the Ocean

Evaluating Marine Protected Areas to Improve Conservation Outcomes

The ocean supports incredibly diverse ecosystems that are vital for life and human well-being. Marine Protected Areas (MPAs) play a crucial role in conserving marine biodiversity, but the benefits for biodiversity and human well-being differ depending on the type of MPA.

This year, researchers conducted South Africa's first national assessment of all 41 MPAs in the country using the *MPA Guide* assessment framework. They reviewed protection levels, expected conservation outcomes, and progress towards national targets. Researchers found that all MPAs are at least Implemented, with 70% of the country's total MPA area classified as Fully or Highly Protected. This highlights the strong potential of South Africa's MPA network to deliver conservation benefits and demonstrates how using the *MPA Guide* can improve national investments in MPA quality beyond simply reporting the percentage of area protected.

Alongside MPAs, marine spatial planning (MSP) is central to ocean conservation. MSP is a

science-based process that develops a blueprint for managing marine areas to account for biodiversity, the blue economy, climate adaptation, sustainable tourism, social justice, equity, and more.

As a leader in MSP science and practice, TNC has developed new technologies, tools, and strategies, including the Marxan Planning Platform (MaPP)—a decision-support tool for conservation planning across terrestrial, freshwater, and marine systems. MaPP helps scale up participatory spatial planning to meet our 2030 goals by enabling stakeholders to align diverse interests and ensure equitable resource allocation. In Tanzania, MaPP is helping identify cost-effective ways to protect coral reef ecosystems while supporting the livelihoods of local fishing communities.

By combining MPAs with strategic marine planning, leveraging innovative tools like MaPP, and fostering inclusive, community-centered governance, we can strengthen marine ecosystem resilience and ensure equitable benefits for both nature and people.



Science for Impact: Revolutionizing Fisheries with AI

To improve ocean resource management, TNC and its Indonesian partner, Yayasan Konservasi Alam Nusantara (YKAN), are pioneering AI-driven solutions to streamline the time-consuming manual data collection process for fisheries management. It allows fishers to capture photos of their catch, which YKAN staff upload to an AI system that rapidly identifies species and records key data like length. Trials with over 100 species show that the AI system is over 99% accurate, capable of providing critical input to sustainable fisheries management.



OCEANS

➤ **2030 GOAL**
Protect **4 billion hectares**
or **more than 10%** of the
world's ocean area.

**Other 2030
Goals Met by
this Project**



Climate
Mitigation



People



CLOCKWISE Tree planting event to kick off to plant trees and study the health impacts of adding foliage to residential areas. © Randy Olson; Chris Chandler planting trees, West Louisville, Kentucky. © Felipe Fittipaldi; Technicians with the Conservador das Águas project planting a variety of native species in a reforestation area in Extrema, Minas Gerais, Brazil. © Devan King/TNC

SCIENCE ACROSS TNC:

Helping People on the Front Lines of the Climate Crisis

How Trees Help Communities Adapt to Climate Change

Extreme heat threatens communities worldwide, disproportionately affecting historically marginalized populations. Urban tree cover offers a powerful way to reduce these risks while offering numerous co-benefits for nature and people. Planting trees lowers summer temperatures, prevents heat-related illnesses and deaths, saves electricity, takes up carbon, and much more.

A recent [study](#) of 5,723 U.S. municipalities found that predominantly white neighborhoods have more trees, providing better cooling and health benefits compared to areas with large racial and ethnic minority populations. As a result, the non-white neighborhoods experience nearly 200 more deaths and 30,000 more doctors' visits annually than if they had the same tree cover. Researchers also found a greater return on investment for health benefits when planting trees in majority non-white neighborhoods, emphasizing the need for public heat action

planning to consider strategies to mitigate the inequity of tree cover benefits.

To better understand how tree planting reduces urban heat risks, the Greening Research in Tacoma (GRIT) [project](#) examined urban tree cover's influence on air temperature and residents' experiences of green spaces and heat in Tacoma, Washington. The [study](#) found that every tree contributes to cooling benefits, with no minimum threshold for tree cover required.

Similarly, the [Green Heart Project](#) launched a first-of-its-kind, neighborhood-level [clinical trial](#) led by the University of Louisville in Kentucky. The goal of the project was to directly measure the health impacts of greening. Researchers [found](#) that planting over 8,000 trees and shrubs reduced residents' inflammation levels by 13-20%, improving health outcomes for diseases caused by inflammation, such as diabetes and cancer.

These findings underscore the powerful connections between the health of our planet and human health. Greening efforts can reduce health disparities, improve living conditions, and strengthen climate resilience. As TNC expands its work on planetary and human health, these insights can help guide conservation efforts with lasting benefits for people and nature.



CLIMATE
ADAPTATION

► 2030 GOAL

Help **100 million people** at severe risk of climate-related emergencies become more resilient through nature-based solutions.

Other 2030
Goals Met by
this Project



Climate
Mitigation



People

Researchers found that planting over 8,000 trees and shrubs reduced residents' inflammation levels by 13-20%, improving health outcomes for diseases caused by inflammation, such as diabetes and cancer.





NEW RESEARCH DIRECTIONS

Catherine Machalaba Leading New Planetary & Human Health Initiative

Our work on planetary and human health took a big step forward in 2024 with the new **Senator Bill and Tracy Frist Initiative for Planetary and Human Health**. Dr. Catherine Machalaba, a leader in bridging conservation and public health, joined TNC in fall 2024 to lead the emerging work made possible by the Frists' generous \$1 million donation. Catherine is passionate about understanding and communicating the links between biodiversity, climate, and health to reduce risks and generate health benefits through conservation and climate action. Previously, as Principal Scientist for Health and Policy at EcoHealth Alliance, Catherine integrated health into protected area management,

environmental impact assessments, and One Health economics, especially in West Africa. She was a lead author of the World Bank's *One Health Operational Framework*, supported the IUCN as a program officer for its Wildlife Health Specialist Group, and currently serves on the One Health High-Level Expert Panel, and advises many international organizations.

This new planetary and human health initiative will make nature's contributions to people more visible, guiding conservation and climate interventions with tangible health benefits. To forge partnerships between the conservation and health community

at local and global levels, assess the health impacts of our projects and conservation sites, and examine ways nature-based solutions can address disease risks, this initiative will support a global team of health and human dimensions scientists in medicine, social epidemiology, public health, anthropology, and health economics.

By leading collaborations at the intersection of biodiversity, climate change, and human health and well-being, TNC aims to be on the frontlines of solutions-oriented science that ensures a healthier planet and people.

LEFT TO RIGHT Healthy Cities Initiative in the Phoenix, Arizona area to reduce heat and increase liveability. © Ivan Martinez Photography; Tontae Basawan displays a flying fish she is about to process at the Bridgetown Public Fish Market in Barbados. © Shane Gross; Water bottles contain a sampling of the water quality, testing clarity of the water to ensure our waters funds work are effective in Jarabacoa, Dominican Republic. © Tim Calver INSET © TNC

Harnessing Innovation: Transforming Conservation Research & Practice

TNC science staff are developing and deploying the latest cutting-edge research techniques and technology to advance our work. Here are a few recent examples:

Supporting Herder Communities through Improved Understanding of Peatlands

Peatlands cover just 3% of the Earth's surface but store one-third of global soil carbon—double the carbon found in all the world's forests. In Mongolia, peatlands are threatened by climate change and overgrazing. To assess the impacts of grazing on peatlands, researchers fitted 57 sheep with GPS trackers across three seasons in Northern Mongolia. This [study](#) mapped grazing overlap on peatlands, identified seasonal differences, and pinpointed heavily grazed areas. These findings laid the groundwork for developing a sustainable peatland management plan in collaboration with herders, while also advocating for the preservation of traditional nomadic herding practices.

Using Satellite Imagery and AI to Monitor Road Development in the Congo Basin

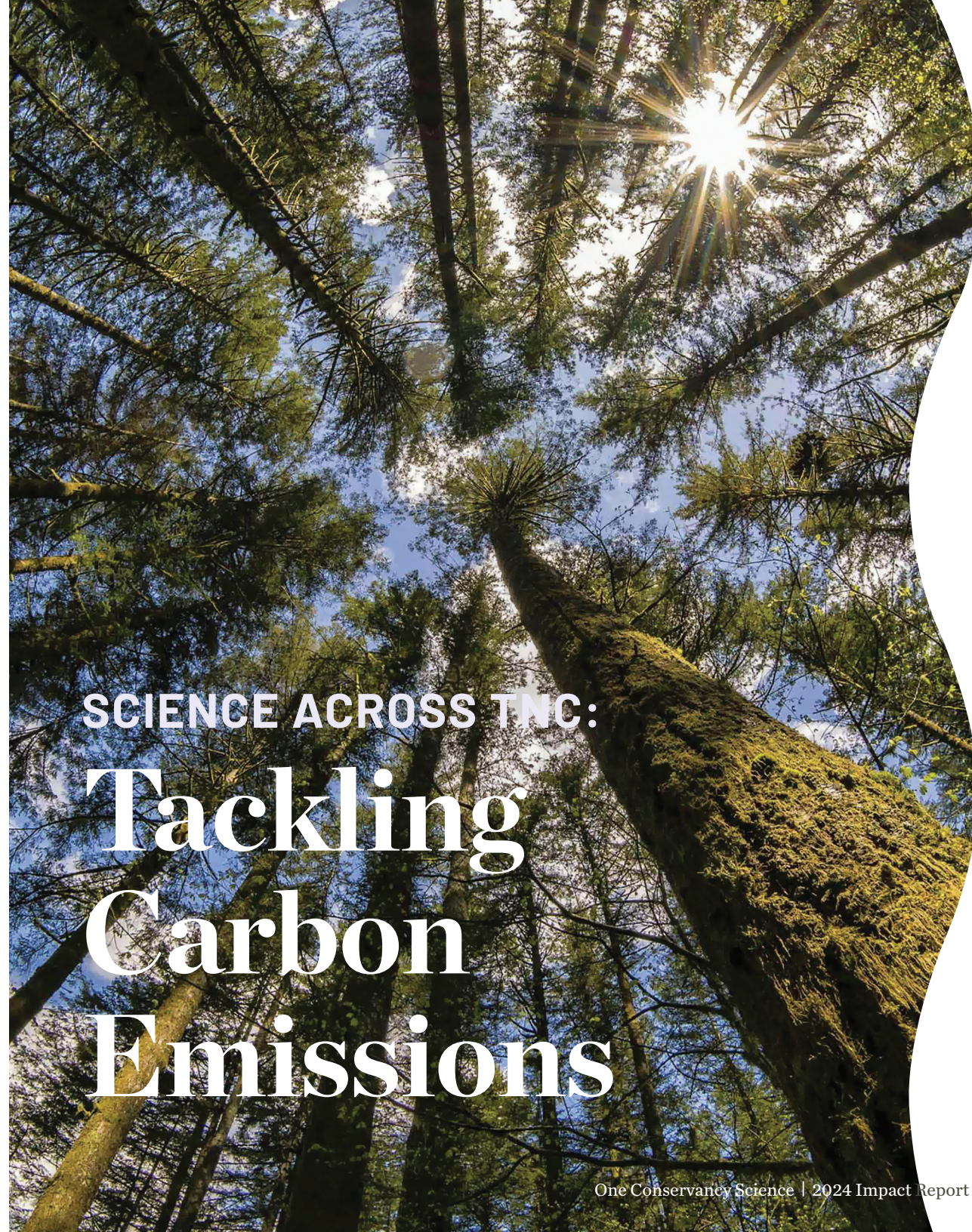
Road construction in remote tropical forests often accelerates deforestation, increasing carbon emissions and biodiversity loss. Frequent, automated road mapping is critical for conservation. A recent [study](#) introduced a new way to track and monitor road development in the Congo Basin region, historically a difficult task. Using satellite imagery and AI, researchers mapped road development with unprecedented detail, detecting roads likely to have been unnoticed by previous state-of-the-art methods. This improved road mapping enables near-real-time monitoring of illegal forest activities and supports better forestry practices that reduce carbon emissions and biodiversity impacts.



TOP TO BOTTOM Herd of sheep grazing. © Jannis Hagels / TNC Photo Contest 2019; Working to fell a Chico Zapote gum tree harvested for its hardwood quality, Mexico. © Erich Schlegel



CLOCKWISE Measuring a tree trunk in Berua District, Indonesia to monitor carbon in a teak plantation. © Bridget Besaw; Nursery for reforestation at Taquari watershed, Cerrado, Brazil, South America. © Wasim Muklashy/TNC Photo Contest 2019; Moulton Falls Regional Park, Washington © Scott Warren



SCIENCE ACROSS TNC: Tackling Carbon Emissions

Improving Reforestation Practices to Reduce Emissions

Natural climate solutions (NCS) sequester carbon and reduce emissions through natural processes. In addition to their climate benefits, they can also benefit biodiversity and human well-being.

One promising NCS for capturing carbon from the atmosphere is restoring tree cover, but reforestation comes with a challenge: its impact on albedo, the amount of sunlight reflected from the Earth's surface. Trees typically absorb more sunlight than the land they replace, especially in semi-arid or snowy regions. This can offset the cooling benefit of their carbon storage. To address this issue, a research team including TNC scientists developed the first global albedo maps. These maps help decision-makers identify reforestation areas with the greatest net cooling potential.

Similarly, while strategic reforestation can significantly mitigate climate change, it can be costly. To address this, another study by TNC scientists and collaborators evaluated the potential and cost-effectiveness of two reforestation methods: natural regeneration and tree planting (primarily for timber). Their analysis revealed that well-planned reforestation projects could deliver up to ten times more low-cost carbon removal than previous IPCC estimates suggested. The resulting maps help countries choose the most cost-effective type of reforestation for a given location to more efficiently achieve their climate targets. With limited time and resources to avert catastrophic global warming, our advancing science and technology enable us to identify the locations and actions that yield the highest climate benefits per hectare of investment. This precision ensures global restoration efforts can be deployed as effectively as possible for climate mitigation.



CLIMATE
MITIGATION

➤ **2030 GOAL**
Sequester **3 billion**
metric tons of
carbon dioxide
emissions annually.

Other 2030
Goals Met by
this Project



Lands



Climate
Adaptation



42 Ways to Reduce Climate Impacts from U.S. Beef Production

Greenhouse gas emissions from beef production in the U.S. vary widely by geography and across the supply chain, from crop and livestock production to processing. A recent study by TNC scientists and partners evaluated 42 practices to reduce beef's climate impact via emission reductions and carbon sequestration. They found that fully implementing all practices could collectively reduce climate impacts by up to 30%, with the greatest potential during the grazing stage. The study also identified key areas for investment to advance climate mitigation. Though opportunities differ by practice and region, researchers emphasize the importance of broad adoption across the entire supply chain to maximize climate benefits within the beef industry.



Coming in 2025: Sustainability Post-Doctoral Fellows

Thanks to a generous \$2.75 million gift to TNC from Kent Thiry, TNC Global Board Member, and Denise O'Leary, Smithsonian Regent, TNC is establishing a Sustainability Fellowship with the Smithsonian Institution in 2025. This program will empower the next generation of diverse, global scientists to advance conservation science. Six postdoctoral scholars will be supported for three-year terms at TNC and cross-advised by TNC and Smithsonian scientists, with the goal of leveraging the diversity of our unique histories and approaches to conservation and accelerating our work toward our 2030 goals. By working together, we can achieve our collective vision of *One Future*: a future that supports a livable climate, healthy communities, and thriving nature.

2024 Media and Social Media Highlights

In 2024, TNC scientists and researchers were featured in numerous global news stories, showcasing the positive impacts of their work on people, nature, and the planet. The launch of the [TNC Science](#) channel on LinkedIn expanded this reach. Here are some news media highlights, and some of our top social media stories.



“It builds camaraderie, great leadership skills, practice in working together, and learning how to work within command structure”

Amy Crouch
TNC

The Trailblazers Academy, a prescribed fire camp in Plymouth County, Iowa, is in its second year. Each free workshop brings together over 50 participants to develop leadership and operational skills. The program has welcomed two cohorts and will be hosting a third in the summer of 2025.

“Wetlands have a superpower: they’re able to buffer against rising seas. Dunes and wetlands can absorb floodwaters and protect the communities that lie behind”

Alyssa Mann
TNC

Sea level rise directly threatens about 30% of Americans living near coastlines; but many communities are finding innovative ways to adapt. In California, TNC scientists are [helping](#) restore dunes and wetlands at Ormond Beach. These natural barriers can absorb floodwaters and protect nearby communities. While the most severe impacts may not be felt in our lifetimes, taking proactive steps now is crucial to protect future generations.



“There are some cool parallels between how oyster farming and eating has helped oyster reef habitat restoration and how commercial seagrass farming could eventually aid seagrass restoration”

Bowdoin Lusk
TNC

On the Danish island of Laeso, the traditional art of eelgrass thatching is being revived. Eelgrass, an abundant marine plant which naturally washes up on Denmark's shores, is twisted into ropes and used to create roofs that are not only durable but also fire and rot resistant. These eco-friendly roofs can last for centuries and contribute to Laeso's candidacy for UNESCO World Heritage status. Beyond its architectural benefits, eelgrass sequesters carbon dioxide at a rate faster than rainforests, making it a powerful ally in the fight against climate change.

Social Media Highlights from LinkedIn

Climate Change Exacerbates the Environmental Impacts of Agriculture

Modern agriculture is a big contributor to climate change, pollution, and biodiversity loss; and climate change in turn threatens agricultural productivity and stability. A recent review finds that climate change could reduce harvests, lessen the effectiveness of fertilizers, and increase damage from pests and soil erosion and warns that some farmers' response might initiate a vicious cycle. Intensifying farming practices could lead to higher irrigation and agrichemical use, and increased energy consumption and emissions. To address these challenges sustainably, researchers suggest investing in new agricultural technologies and adopting new foods and healthier diets that require fewer resources.

The Nature-Based Credit Science Decoder Series: Blue Carbon

Blue carbon ecosystems like mangroves and seagrasses can sequester carbon at rates up to 10 times those of terrestrial forests. Understanding scientific best practices for crediting blue carbon projects is crucial to ensuring these markets operate with integrity and maximize climate impact. TNC's report “Blue Carbon: Scientific Best Practice Guides for Land-Based Carbon Projects,” on the latest methods and tools for developing high-quality blue carbon credits, is an essential resource for blue carbon credit buyers, as well as policymakers, practitioners, and other stakeholders.

Forest Canopy Keeps Cool During Extreme Heat Events

As extreme heat events become more common with climate change, forest cover can keep things cool—but by how much? In a recent study based on research at TNC's Ellsworth Creek Preserve, TNC and University of Washington found that forest understories in the preserve were 3°C cooler than a nearby clear-cut area and 4°C cooler than regional temperatures during the Pacific Northwest extreme heat event in June 2021. This is good news for forest species that are sensitive to such extreme heat events, but it also puts a limit on how much forests can offset warming during a heatwave.



What You Can Do

TNC staff collaborate with partners in every U.S. state and 80 other countries around the world. Nonprofits, universities, Indigenous and local communities, government agencies, private businesses, and other organizations—we know it's essential we work together to address the biodiversity and climate crises.

You don't have to be a scientist or work for TNC to make a difference. We all depend on our planet for air, water, and food—and by working together, we can be nature's best protector. Wherever you are, whatever your background, there is an opportunity to get involved.

If you love nature...

- Volunteer with us. There are lots of opportunities to connect with nature and make a difference in your community. Across TNC, you can find a volunteer position just right for you.
- Explore a preserve near you. Find out firsthand what makes the places we protect so special.

If you're an educator, parent, or caregiver...

- Explore TNC's Nature Lab: it provides hands-on educational resources to help students, ranging from age 5 to 18, learn the science behind how nature works for us and how we can help keep it running strong.
- Get outside! Enjoy time in nature together to take advantage of the many physical and mental health benefits that nature provides, including lowering stress and anxiety, improving sleep, and lifting our moods.

If you love science...

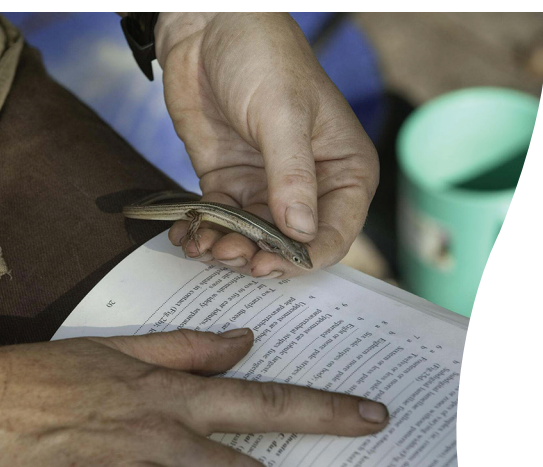
- Sign up for our monthly science newsletter that highlights TNC science and tools, our scientists, TNC science jobs, public webinars, and some of our latest publications.
- Follow us on LinkedIn for more news about our research and how it supports our people and nature goals.
- Follow us on Bluesky! Bluesky is a new social media platform that's quickly becoming the place for scientists and science discussions online.

If you're a student or early career scientist...

- Check out our externship program, in partnership with the National Geographic Society. This unique online learning and mentoring program for adults aged 18 to 25 equips young leaders with the knowledge, tools, and relationships to seek solutions and take action for nature.

If you are a TNC supporter...

- Watch our Science in Action webinars.
- Make a donation: Your support of One Conservancy Science at TNC drives new innovations and strengthens the science-based foundation for our efforts around the world to address the biodiversity and climate crises. Every amount matters and makes a difference. For more information, please email paige.martin@tnc.org.



TOP TO BOTTOM Young boy splashing about on the beach in Sri Lanka. © ALaura Stoecker; A field scientist identifying a lizard using reference material. © Dylan McAdam/TNC Photo Contest 2016; Volunteers plant young trees at Burnham Park, Chicago. © Ted Wood



The Nature Conservancy
4245 North Fairfax Drive,
Suite 100
Arlington, Virginia 22203

Our Mission: To conserve
the lands and waters on
which all life depends.



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