



# HALF-EARTH PROJECT

Impact Report 2023



# INTRODUCTION



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**E.O. Wilson** encouraged us to transform our relationship to nature by knowing everything we can about the planet and its abundant life, from mighty ants to majestic whales. Through the Half-Earth Project, we are helping the world take an important step forward by informing public leaders; conservation and nonprofit organizations; federal, state, and local agencies; and private-sector companies to recognize how species loss affects all life and by inspiring strategic conservation decisions that protect the most important biodiverse places on Earth.

The Half-Earth Project Map is deepening our understanding of nature and identifying what specific places can best protect and support the bulk of biodiversity. Our professional training programs are helping practitioners and scientists who live and work in the world's most critically biodiverse areas learn how to use cutting-edge technology and data applications to inform strategic conservation decisions. And, finally, we are inviting the public to reimagine humanity's relationship with nature by bringing together thought leaders at public events like Half-Earth Day.

In a speech last year, Paula J. Ehrlich, Ph.D., president and CEO of the E.O. Wilson Biodiversity Foundation, said:

**“WE STAND ON THE SHOULDERS OF GIANTS, AND FROM THAT PERCH—IN THIS MOMENT—WE HAVE OUR FINGERTIPS ON GEOSPATIAL INFORMATION THAT ALLOWS US TO SEE FARTHER AND MORE CLEARLY THAN WE EVER HAVE BEFORE ABOUT WHAT WE NEED TO DO TO BEST CARE FOR OUR PLANET.”**

The E.O. Wilson Biodiversity Foundation and the Half-Earth Project are moving with intention and urgency to not only protect our planet's wondrous biodiversity, but also to ensure it thrives. We are grateful for your support and the support of all of our Half-Earthers in this work. Thank you for your partnership and, most importantly, for your commitment to all of life.

# DEEPENING THE SCIENTIFIC UNDERSTANDING OF LIFE ON EARTH

The E.O. Wilson Biodiversity Foundation is leveraging our science to support countries as they begin to implement the tenets of the Kunming-Montreal agreement and 30x30 goals, i.e., saving 30 percent of the planet's land and water by 2030. To this end, we are forming partnerships with government agencies in high-biodiversity countries across the world, including the Democratic Republic of the Congo (DRC), Guinea, Liberia, Sierra Leone, and countries in the Association of Southeast Asian Nations (ASEAN). We support their work with dedicated geospatial biodiversity monitoring dashboards, a range of conservation prioritization and planning information, and the integration of local and global species data through the Half-Earth Project Map. Additionally, we are engaging government-employed geospatial environmental technicians and other early-career specialists to work with the Half-Earth Project team at Yale University, led by the E. O. Wilson Biodiversity Foundation's Jack and Laura Dangermond Scientific Chair, Walter Jetz.

For example, we are working with the DRC Congolese Institute for the Conservation of Nature, which is nationally responsible for protected areas in the DRC, and developing tailored country-specific products to support its work. Its national biodiversity dashboard displays species distribution, changing habitats, and species-specific Global Biodiversity Framework indicators to measure conservation successes. As part of this initiative, we are developing an easy data collection method for park rangers to identify species and integrate observations into the dashboard. This will support real-time monitoring and reduce costs for national-level inventories and assessments while also allowing the Institute to showcase its biodiversity stewardship responsibility to international audiences. In 2023, members of our science team traveled to Kinshasa to formalize these plans with the DRC Scientific Advisory Committee.

During the past year, our science and technology team continued to develop the Half-Earth Project Map and its associated tools, adding and expanding elements and features, including:

- **SPECIES PROTECTION INDEX (SPI) AT STATE/PROVINCE LEVELS:** This new feature calculates the SPI at state/province levels for all countries. This allows for a more nuanced look at stewardship responsibilities and better supports local conservation planning.
- **IRRECOVERABLE TERRESTRIAL CARBON LAYER:** This new map layer, showing irrecoverable carbon by tons per hectare in both biomass and soils, is critical for highlighting areas that can achieve both biodiversity and carbon goals.
- **NEW HUMAN PRESSURE LAYERS:** This new map layer assesses human pressures over time, starting from 1990, at the high resolution of 300m. These layers include agriculture, energy production/extraction, human intrusion, transportation, and urban areas.
- **NEW RARITY AND RICHNESS LAYERS:** In the United States and Canada, the Half-Earth Project Map now offers 1 km-species richness and rarity layers at an unprecedented level of detail for six species groups: amphibians, butterflies, mammals, reptiles, summer bird ranges, and winter bird ranges.
- **FLEXIBLE SELECTION TOOL:** Conservation educators, managers, and planners can now use a drawing feature on the map to select the area they would like to analyze. Previously, the map analyzed areas only by national boundaries.

The need for the Half-Earth Project Map is clear, and we are excited to work side by side with countries to provide them with the information and support they need to make better, more informed conservation decisions.

# WORKING ALONGSIDE PEOPLE AND COMMUNITIES TO REIMAGINE OUR RELATIONSHIP WITH NATURE

The landmark Kunming-Montreal agreement shined a global spotlight on protecting biodiversity and nature. To meet this moment, the Half-Earth Project is working to train and support experts in biodiversity science who live and work in important conservation ecosystems around the world. Additionally, we are working with educators across the country to train the next generation of conservation stewards.

## Half-Earth Chairs and Scholars

The Half-Earth Chairs and Scholars are engaged at local and regional levels in biodiversity conservation in landscapes of critical importance to the Half-Earth Project. The inaugural Half-Earth Chairs and Scholars program in Gorongosa National Park and the E.O. Wilson Biodiversity Lab started in 2020. Since then, the program has trained seven young Mozambiquan scientists through the guidance and mentorship of Half-Earth Chair, Piotr Naskrecki, Ph.D.

Now, the Half-Earth Project is working to support Half-Earth Chairs and Scholars in geographic regions throughout the world through four-year cycles of support. An advisory board of individuals with unique insight into cutting-edge regional biodiversity work is working to identify and nominate two new Half-Earth Chairs. The board includes Krithi Karanth, whose research in Asia spans 25 years, focusing on human dimensions of wildlife conservation; Lesley de Souza, a conservation biologist and a member of the rapid inventory team in the Keller Science Action Center of the Field Museum; and Tom Lalampaa, the CEO of Northern Rangelands Trust and a leading African conservationist who has been instrumental in championing community conservation efforts in Kenya; in addition to E.O. Wilson Biodiversity Foundation leadership Paula Ehrlich, Walter Jetz, Piotr Naskrecki, and Brooks Bonner. The next Half-Earth Chair will be announced on Earth Day 2024.



Piotr Naskrecki, Half-Earth Chair

## Half-Earth Project Educator Ambassador Network and Institutes

To protect the future of our planet, we must inspire future generations of conservation leaders. The Half-Earth Project Educator Ambassadors program is partnering with teachers across the country to do just that. The program continues to grow into a robust network of teachers engaging youth in biodiversity science and conservation. The network has more than 900 official ambassadors and four times that number of educators engaged in the broader community. Ambassadors are in 39 states and Washington, D.C., with access to more than 100 different lesson plans for use in the classroom.

We are strengthening and growing the community. In 2023, we held 10 events in the field for ambassadors to attend or in coordination with ambassadors at their schools. We are deepening engagement in the Foundation's home state of North Carolina, where we have established a North Carolina Advisory Group, centering the voices of current educators to ensure that we are attuned to the diverse aspects and needs of students in our schools today. Our North Carolina Advisory Group convened for the first time earlier this year and included individuals representing Durham County Schools, Wake County Schools, Chatham County Schools, the Museum of Life and Science, and the North Carolina School of Science and Mathematics. The feedback from the advisory group underscored the need for a curriculum aligned with the new science standards and with local and cultural relevance.



Half-Earth Educator Ambassadors participate in a workshop.

Additionally, we have recruited a new cohort of Half-Earth Master Ambassadors, who will work with us on an ongoing basis to draft and review curriculum, support our growing network of teachers, and represent us at workshops and trainings. We are excited to present the new Master Ambassador cohort:

**LISA BORGATTI** is a high school biology, chemistry, and AP Environmental Science teacher at The Governor’s Academy in Byfield, Massachusetts, where she serves as the program director of Sustainability in the Afternoon, advisor of the Environmental Club, and co-chair of the Sustainability Committee.

**ROBYN EMBRY** is a high school science teacher in Mitchell, Indiana, where she teaches AP and dual credit courses in environmental science, biology, and biotechnology and serves as an adjunct instructor of biomanufacturing at Ivy Tech Community College.

**MISSIE OLSON, PH.D.**, is a high school science teacher in Becker, Minnesota, where she teaches biology, earth science, and dual credit environmental science and is an adjunct faculty member at Bethel University. She received the 2023 Outstanding Earth Science Teacher Award for Minnesota.

**LINDA ROST, PH.D.**, is a high school science teacher in Baker, Montana, teaching biology, anatomy and physiology, chemistry, AP Biology, and science research and serves as an adjunct instructor at Miles Community College. She was the Montana recipient of the 2023 Outstanding Biology Teacher Award.

**SELIM TILLI** teaches high school biology at The Beekman School in New York City and was formerly an educator at the Rudolf Steiner School and in New York City Public Schools. Selim has roots in Puerto Rico and Tunisia and studied biology before earning master’s degrees in environmental health at Hunter College and environmental humanities at Harvard University.



Black Bear Singers, a powwow drum group from the Atikamekw community of Manawan, Quebec, conclude Half-Earth Day 2023.

## A CATALYST TO LEAVE NO SPECIES BEHIND

We are amplifying the voices of people working to solve the extinction crisis through policy engagement, movement building, and communications.

### Half-Earth Day 2023

Now in its seventh year, [Half-Earth Day](#) is a movement-building event that is celebrated in communities around the world. This year, the organizational event was held on [October 12 in Montreal, Quebec, at GEO BON](#) and focused on how we can link information to action. The gathering focused on how we can use the best available science to support communities in their understanding and stewardship of biodiversity and empower stakeholders to ensure truly successful conservation outcomes.

The event featured opening remarks from Jack Dangermond, president of Esri, and discussions were emceed by Academy Award winner and filmmaker Louie Psihoyos. The James M. and Cathleen D. Stone Distinguished Lectureship in Biodiversity capped off the day with Wade Davis, Ph.D., acclaimed cultural anthropologist, author, and photographer. In his keynote remarks, he said: “You’re sowing the seeds from science into the hearts of people. This is something Ed Wilson understood more than anyone.... He knew that fear never provoked change. Only hope did.” A highlight of the event was a performance by the Black Bear Singers, a powwow drum group from the Atikamekw community of Manawan, Quebec. See highlights from the day [here](#).

We are grateful to Half-Earth Day sponsors for helping make this another tremendous event, including presenting sponsor John D. and Catherine T. MacArthur Foundation; contributing partner Bezos Earth Fund; and with generous additional support from ADM, Esri, Houdini, GEO BON, and the James M. & Cathleen D. Stone Foundation.



LEFT: Kelly Levin, chief of science, data and systems change, Bezos Earth Fund MIDDLE: Brooks Bonner, Dennis Liu, Alison Taylor, Paula Ehrlich, Amy Tidovsky, and Raymond Farrow RIGHT: Alison Taylor, chief sustainability officer, ADM

Sessions included:

- **Wildfires, Biodiversity, and People:** Experts from academic science and an indigenous community reflected on the impact of fires in Australia and Canada on species and people and how to prepare for future incidents. Featuring Luke Kelly, associate professor in quantitative ecology, University of Melbourne; Eliot McIntire, research scientist, Canadian Forest Service; and Sam Hunter, natural resources monitor, Weenusk First Nation.
- **Safeguarding Species in a Changing World: The Role of Science:** Researchers presented facets of recent science progress on invasive species, threats to species in a warming ocean, and effective area-based conservation in Canada and worldwide. The presentations were followed by a conversation on key knowledge gaps and opportunities. Featuring Walter Jetz, Jack and Laura Dangermond Scientific Chair, E.O. Wilson Biodiversity Foundation, and professor, Yale University; Kelly Levin, chief of science, data and systems change, Bezos Earth Fund; Melodie McGeoch, professor, La Trobe University, and adjunct professor, Monash University; Derek Tittensor, associate professor and Jarislowsky Chair, Dalhousie University; Laura Pollock, assistant professor, McGill University; and Tamara Rudic, science communications specialist, Center for Biodiversity and Global Change, Yale University.
- **Safeguarding Species in a Changing World: From Knowledge to Action:** Members of the business, technology, policy, and philanthropic community reflected on how scientific advances support their decisions and on key knowledge needs unmet by current science and technologies. Featuring Walter Jetz, Jack and Laura Dangermond Scientific Chair, E.O. Wilson Biodiversity Foundation, and professor, Yale University; Sean Breyer, program manager, Living Atlas of the World, Esri; Alison Taylor, chief sustainability officer, ADM; James d’Ath, technical lead for data and analytics, TNFD; María Cecilia Londoño, senior information manager, Humboldt Institute; Jorgen Thomsen, director, Climate Solutions, MacArthur Foundation; and Kelly Levin, chief of science, data and systems change, Bezos Earth Fund.
- **Linking Information to Action:** Wade Davis gave the keynote address, the Black Bear Singers provided a musical performance, and Paula Ehrlich gave the closing remarks.

In association with Half-Earth Day, Bezos Earth Fund’s Kelly Levin, chief of science, data and systems change, working with Walter Jetz, held a workshop on “Biodiversity Measurement and Monitoring: Critical Gaps and Future Directions” that brought together experts, developers, and users to further understand the evolving state of biodiversity observation, monitoring, and measurement. It explored the needs and existing gaps for decision-support use cases and identified areas for transformative activities and collaboration to enhance impact.



LEFT: Paula Ehrlich MIDDLE: Laura Pollock, assistant professor, McGill University, Walter Jetz, and Luke Kelly, University of Melbourne RIGHT: Wade Davis, Ph.D., acclaimed cultural anthropologist, author, and photographer

## Inspiring Policy Action

Rep. Don Beyer (D-VA), author of the Wildlife Corridors Conservation Act, marked the International Day for Biological Diversity by reintroducing a resolution in support of the Half-Earth Project in March 2023. “Protecting our planet’s biodiversity was the life’s work of my friend Dr. E.O. Wilson, and I am determined to help that work continue,” said Beyer. The resolution is endorsed by the E.O. Wilson Biodiversity Foundation, The Wilderness Society, Center for Biological Diversity, Defenders of Wildlife, Earthjustice, Friends of the Earth, Endangered Species Coalition, and Environment America.

## Sharing the Urgency of Half-Earth

By communicating the crisis and solutions of biodiversity loss to key audiences, the Half-Earth Project is building a movement and inspiring action to reimagine how we care for our planet. Select highlights are listed below.

- Paula Ehrlich explained E.O. Wilson’s vision for Half-Earth in the hit PBS show “[EcoSense for Living](#).” The episode also featured writer Ben Raines on the rich biodiversity of Wilson’s home place in the Mobile River Basin of Alabama.
- The PBS Digital Show “Far Out” featured E.O. Wilson, the Half-Earth Project, and the Places for a Half-Earth Future map in a segment, “[Why Tree Planting Campaigns Don’t Work](#).”
- Paula Ehrlich appeared in an episode of [Sustainability Defined](#), an acclaimed environment and conservation podcast downloaded in over 100 countries, included on course curricula at universities across the United States, and regularly listed as one of GreenBiz’s top sustainability podcasts.
- Walter Jetz and Tamara Rudic [wrote a column in Esri’s ArcNews](#) outlet highlighting species indicators as useful tools for achieving goals set in the new Global Biodiversity Framework. The Half-Earth Project was identified as the key resource to provide decision support and measurement for several targets. The print version of ArcNews reaches over 1 million spatial analysis practitioners in industry, government, and academia.
- Dennis Liu appeared in the Wilder Lecture Series with the Harvard Extension School and presented on “Saving Half the Earth.” Additionally, he presented with the Fox Haven Farm & Retreat Center and Northeast Wilderness Trust lecture series, where he discussed how protecting one species—like dragonflies or hummingbirds—often benefits others.
- Walter Jetz, in coordination with a group of scientists, published the paper, “A globally integrated structure of taxonomy to support biodiversity science and conservation,” in *Trends in Ecology & Evolution* in December 2023.



- The E.O. Wilson Biodiversity Foundation was proud to support and participate in the [Land & Carbon Lab's 2023 Summit: Monitoring Land, Mobilizing Action](#). The event, held in Brussels in June 2023, brought together more than 500 participants, including policymakers, practitioners, and innovators, seeking to harness the power of geospatial data to achieve this decade's climate, nature, and sustainable development goals. At the opening reception, Paula Ehrlich provided introductory remarks. During the summit, Walter Jetz presented "The State of the Art of Biodiversity Data and Ecosystem Monitoring," which provided an in-depth look at the science behind the Half-Earth Project Map, and Alex Killion, Half-Earth Project Map managing director, presented "Global Targets: Linking Local, Landscape, and National Monitoring Efforts."
- Paula Ehrlich spoke at the Massachusetts Institute of Technology (MIT) Morningside Academy for Design annual forum, The Power of Design, with a theme of "Designing Climate Futures." The forum aimed to show how design can address the climate emergency by helping to produce new ecological, spatial, and social conditions rather than mere technical fixes. The forum brought together a group of designers who are proposing diverse and highly transformative approaches to the climate crisis, spanning from the local to planetary scale. Ehrlich and the work of the Half-Earth Project were a key part of this conversation. During her presentation, Ehrlich said, "In the same way that a surgeon can't do surgery without an intimate knowledge of anatomy and physiology, knowing every single species and their location is fundamental to being proper stewards of the planet. Having this knowledge will inevitably transform our human understanding and allow us to reimagine how to care for our planet." See the video [here](#).
- At the Ecological Society of America Annual Meeting, a gathering of leading research ecologists and conservationists, in Portland, Oregon, Dennis Liu, Ph.D., vice president for education, presented how student attitudes are affected by using the Half-Earth Map to explore biodiversity and human impacts. Speaking to an overflowing room of ecologists interested in improving education, community interactions, and, especially, engagement with the next generation of environmental stewards, Liu said, "Our preliminary results indicate that focusing student learning on local biodiversity, rather than in faraway and exotic locales, deepens their appreciation of conservation challenges." Other presentations at the meeting associated with the E.O. Wilson Biodiversity Foundation included:
  - Alex Killion, "Using the Half-Earth Project Map and Map of Life Data, Tools, and Indicators for Biodiversity Research and Conservation Planning";
  - Richard Li, Yale Ph.D. student, "Model-Supported Identification and Mapping of Taxonomic Uncertainty in Biodiversity Occurrence Data"; and
  - Diego Ellis-Soto, Yale Ph.D. student, "Data Integration for Ecological Forecasting: Elevational and Physiological Offsets Improve Species Distribution Models".

## Strengthening the E.O. Wilson Biodiversity Foundation



Over the last year, we have continued to develop and grow the organization. We welcomed **BROOKS BONNER** as our new program director. In his role, Brooks is building relationships across global networks of scientists, scholars, and communities working to advance biodiversity science. He will be working with our scientific team to foster utilization of the Half-Earth Map to inform conservation decision-making and also sharing impact stories that will rally broader support for robust biodiversity protection among key audiences around the world. Brooks has extensive experience in collaborative initiatives in Latin America and Africa, where he focused on community-based conservation, sustainable development, and international education.

Previously, he worked for Nature & Culture International and the Organization for Tropical Studies, which E.O. Wilson helped found. Brooks holds a master's degree in international environmental policy from the Middlebury Institute of International Studies at Monterey and a bachelor's degree in intercultural communication from San Francisco State University.



**NIQUOLE ESTERS** will serve as the vice president of strategic engagement. In her role, she will lead communications and external affairs, including public relations and corporate social responsibility. Niquole spent almost 20 years working across the Asia Pacific, Africa, and Latin America with Conservation International, specializing in large-scale program design and strategy, program management, fundraising related to oceans and coasts, and promotion of inclusivity and diversity across environmental philanthropy as part of a broader reimagining of conservation. She received her bachelor’s degree from Washington and Lee University and her master’s degree in Geopolitics, Territory and Security from King’s College London.



**RAYMOND FARROW** is the new director of development operations. In his role, he is ensuring robust strategies are implemented, supported, and progressing around donor opportunities and stewardship. Prior to joining the E.O. Wilson Biodiversity Foundation, Raymond served as lead development officer and senior administrator at the University of North Carolina at Chapel Hill for more than two decades. For many of those years, he led major international and global initiatives across campus. As associate provost for global affairs, he was the chief operating officer of UNC Global, a group of pan-university programmatic and service units that support Carolina’s global mission. A Phi Beta Kappa graduate of Wake Forest University, Raymond received a Master of Arts in Law and Diplomacy from The Fletcher School of Law and Diplomacy at Tufts University.



**JOCELYN MILLER, PH.D.**, joined as the new education program manager. In her role, Jocelyn is expanding capacity for our existing education initiatives and exploring new opportunities. She brings years of experience as a classroom science teacher of both middle and high school students and deep skills in curriculum development and alignment to standards across the United States. As part of her national science education work, Jocelyn has impressive networks in Alabama, Michigan, North Carolina, and Texas. She earned a master’s degree in education from the University of Houston and a Ph.D. in STEM curriculum and instruction from Texas Tech University, where her research focused on climate-change education.

## Welcome New Board Members



**DINESH NANDAN** is an experienced corporate attorney who advises on corporate, governance, regulatory, and contract matters. Dinesh spent the first decade of his career as corporate in-house counsel for Providian Financial. He then joined Education Finance Partners, a startup focused on private student loans, as general counsel and secretary. He later became founding executive of Home Value Protection, Inc., a Kleiner Perkins-financed company, and most recently, served as general counsel and secretary of Humu, Inc., a human resources startup. Dinesh studied microbiology and history at University of California, Berkeley, and completed a law degree at the University of San Francisco. During his time at the University of San Francisco, Dinesh worked at the Asia Foundation in Phnom Penh, Cambodia, supporting its democracy-building initiatives with the newly elected democratic government.



**ALISON TAYLOR** is chief sustainability officer for ADM. She oversees the company’s global sustainability strategy and works closely with the Sustainability and Corporate Responsibility Committee of ADM’s Board of Directors. She oversees many facets of the company’s progress toward achievement of the UN Sustainable Development Goals, including Zero Hunger and Climate Action. She guides implementation of the company’s Respect for Human Rights policy, No-Deforestation policy, Strive 35 environmental stewardship program, and philanthropic efforts through ADM Cares. Prior to joining ADM, Alison worked for Siemens Corporation, where she was vice president and chief sustainability officer of the Americas. Alison also worked on Capitol Hill as counsel for the U.S. House of Representatives Committee on Energy and Commerce and chief counsel of the U.S. Senate Committee on Environment and Public Works. She was previously a partner in the law firm now known as Davis, Graham and Stubbs, LLC.



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## THANK YOU!

Like E.O. Wilson, the **E.O. Wilson Biodiversity Foundation** is recognized as a thought leader in the work to protect our planet. We are informing solutions on a local and global scale and helping to address complex, multifaceted challenges. We know that the time to disseminate our tools and knowledge to the world's decision makers so we can safeguard species, including our own, is now. It is because of you—our partners, supporters, and friends—that we are able to inform important changes and lead the way towards a new relationship with nature. Thank you for walking beside us on the path to protect half the Earth.

