

Highlights



We envision a world where the diversity of life on Earth is valued and sustained for the benefit of all.

Our Mission is to generate solutions that sustain Earth's biodiversity in a time of rapid biophysical, institutional and cultural change.

What we do Through research and education, we address the global extinction crisis by generating innovative solutions to address biodiversity loss. We generate and curate cutting-edge conservation research that helps decision-makers assess their biodiversity impacts and determine how best to support biodiversity goals. We inform the public about biodiversity solutions and we lead education programs that mentor the next generation of conservation leaders.

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What is biodiversity?

Biodiversity is the variety of interacting species that sustain all life on Earth.

Why does biodiversity matter?

Biodiversity keeps our local ecologies healthy and life-sustaining. As the source of abundant and clean water, food, and air, healthy biodiversity is vital to securing planetary prosperity and helping communities adapt to a changing environment. Biodiversity also helps temper our weather, support a stable water supply, and protect many regions against flood and drought. Without biodiversity, ecosystems are unable to remain in balance. Unhealthy ecosystems can cause plant and animal loss or extinction, poor air quality, unsafe water and many other ecological challenges.

What about climate change?

Biodiversity and climate change are inextricably linked. Biodiversity improves landscape resilience and helps reduce the global impacts of climate change. Biodiversity can protect against severe droughts, desertification, fire, floods, and poor soil quality by supporting healthy and thriving ecosystems. Forests and other biodiverse ecosystems also reduce carbon in the atmosphere, thereby helping stabilize planetary weather and climate.

What is the current state of biodiversity?

Today, one million plant and animal species are threatened with extinction and half of the world's human population is at risk of food insecurity. The World Economic Forum considers biodiversity loss among the top three risks to humanity, alongside weapons of mass destruction and climate action failure. While climate change may be irreversible, nature is still thriving in many parts of the world. It is not too late to protect and preserve our planet's biodiversity.



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Biodiversity is “the natural capital that we need for human well-being,”

— Leah Gerber

At ASU's Center for Biodiversity Outcomes, we believe that complex problems demand innovative and collaborative solutions.



We are here to help generate biodiversity solutions

The Center for Biodiversity Outcomes produces tangible solutions to today's biodiversity challenges by bringing applicable and actionable science to global decision-makers. We work with governments, communities, and the private sector to support informed decision-making that achieves both environmental and social goals. We embrace multi-disciplinary approaches that assess humanity's ecological impacts and we provide tools to help communities and agencies achieve biodiversity objectives. Our work empowers conservationists to engage in informed and collaborative action, knowing that shared challenges are best solved when communities work together.



Protecting life on earth — biodiversity — requires both innovative thinking and action. We need to understand the earth in every possible way — physically, biologically, sociologically — and we need to create interdisciplinary teams that work together to generate new tools and behaviors that produce tangible solutions.”

— Michael Crow





Center for Biodiversity Outcomes

is a partnership between:

Global Institute of Sustainability and Innovation

School of Life Sciences



The design of the College of Global Futures is intentionally transdisciplinary so that students participating in this new academic community graduate with the broad knowledge base and skills needed for the 21st century.”

— University Provost Nancy Gonzales

The Global Futures Laboratory’s interdisciplinary strength is based on five pillars:

Learning

Exploring new ways of transmitting knowledge to diverse audiences.

Discovery

Leveraging the tools and expertise of transdisciplinary research centers across ASU, anchored by the Global Institute of Sustainability and Innovation, to generate new ideas and solve problems.

Solutions

Working with communities affected by ecological challenges to develop solutions — such as with the Rob and Melani Walton Sustainability Solutions Service.

Networks

Partnering with leading institutions around the world, such as the Earth League, to achieve a critical mass of intellectual resources to address challenges that are too big for any individual organization to solve alone.

Engagement

Engaging with people who are affected by a problem to understand their needs, learn from their knowledge, share ideas, and mobilize action.

“With our partnership with ASU’s Center for Biodiversity Outcomes, we can be transformational in what we do. The partnership will help us answer the fundamental question of how we can live on the planet without exhausting the resources we all need to survive.”

— **M. Sanjayan,**
Conservation International CEO



“The Center for Biodiversity Outcomes has helped me connect with other interdisciplinary researchers working on biodiversity topics across campus. Especially during the COVID-19 pandemic where chance meetings were less common, I appreciated CBO serving an organizing role to bring people with similar broad interests but different disciplinary backgrounds together.”

— **Kailin Kroetz**



Leah Gerber is a professor of conservation science in the School of Life Sciences and founding director of ASU’s Center for Biodiversity Outcomes. Gerber has pioneered new approaches to conservation planning and management, and has published more than 150 peer-reviewed articles in leading scientific journals (e.g., Science, Nature, PNAS, American Scientist and Ecology Letters) in addition to prolific and diverse editorials, commentary and position pieces. She is a fellow with the American Association for the Advancement of Sciences, and recently served as lead author of the Global Assessment of the United Nation’s Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services.

Gerber leads a vibrant empirically-based research program that enables discoveries and solutions to help conserve and sustainably manage the Earth’s biodiversity. Gerber enjoys collaborating with non-academic and corporate sectors to develop innovative conservation methods, such as conservation finance and corporate biodiversity accountability. Gerber has garnered a broad base of research funding, including a National Science Foundation (NSF) Career Award and an award from Pew Charitable Trusts. Because of her leadership, the Center for Biodiversity Outcomes is pushing the frontier of the unknown, pioneering new models of engagement as part of the NSF Science and Innovation Policy program. As an Aldo Leopold Leadership Fellow, Gerber is passionately committed to communicating the relevance of science in tackling the complex environmental challenges of the 21st century.

Conservation Innovation Lab

The Conservation Innovation Lab is an interdisciplinary and collegial group of ecologists, mathematicians, economists, geographers and conservation scientists who aim to conduct research that has real-world impacts. With a grounding in natural history and an appreciation for the interactions between humans and the environment, our work employs decision science to inform policies that help sustain life on Earth.

As one of several research and development labs for the ASU Center for Biodiversity Outcomes, the lab contributes research insights to questions posed by partner organizations.

Our approach is to co-produce scholarship and solutions – to leverage our institutional strengths to protect nature, promote sustainable development models and train the next generation of conservation leaders. We often work at disciplinary boundaries, so by definition our work is interdisciplinary. We share a commitment to integrating insights from natural and social sciences into tenable decision tools and policy. In turn, the center provides hands-on opportunities for students and postdocs.





Student Spotlight

Since founding the center in 2014, we have completed 48 student hires from six different schools across the university. Our students engage in various projects, including scientific research, communications and marketing, project management and event planning.

We engage students in projects that align with their career interests and provide them with hands-on experiences and mentoring to help them hone their transferable skills and learn to network with professionals in their field, gaining a competitive advantage in the workforce.

“Through coursework, research and applied projects with classmates and scholars from multiple disciplines, students will learn how to collaborate across sectors and design sustainable solutions that solve the complex challenges facing our globe.”

— **University Provost Nancy Gonzales**

“These students want to be practitioners out in the real world, working on the ground to solve problems. Here at ASU, they are being taught by people who are actually doing that.”

— **Leah Gerber**

Paola Sangolquí

Originally from Ecuador, Paola is a Phd Student in Biology and Society at ASU. Paola's research focuses on the relationship between ecological conservation and human wellbeing. She is particularly interested in marine and coastal habitats and how overfishing, climate change, tourism, marine pollution and other human related activities are affecting these areas in order to promote proper science-based management decisions. Her goal is to develop monitoring protocols that help assess and improve conservation decision-making processes.

How did you come to ASU?

"I was working in my home country at the Galapagos National Park and wanted to continue my education. I liked ASU because it has a very interdisciplinary program for ecology, economy, and ethics - it was basically everything that defines the place where I live in the Galapagos. I was looking for a holistic program that complemented my experience and my expectations about how conservation management should be done. Then I met Leah Gerber and she introduced me to the CBO - that was it for me because their research is the solution for what I thought was one of the main problems of the Galapagos National Park. We are not implementing decisions based on science, based on the data we are collecting in the field. CBO's work is about better decision-making, going beyond academia and bringing science into action. That's what I really like about Leah Gerber's work and what she does at CBO."



What have you learned while being part of CBO?

"I've learned so much from my colleagues in the CBO lab. I've learned how to base conservation decisions on science and data. I've learned how to link monitoring protocols to decisions. The lab is very diverse yet we are all following the same Structured Decision Making (SDM) approach - let's do science but let's make the science count."

"Through CBO's Galapagos case study (part of my dissertation) I can illustrate how the SDM approach can be useful for decision making and then hopefully stakeholders and decision makers can implement or replicate this approach in other decision contexts."

What will you take with you after your time at ASU?

"What I will take with me is this incredible community of women in science who support each other. At our meetings, we have different approaches and perspectives, so I really value the feedback I get from my colleagues - that's the most important thing for me. Even though we have different research projects, in the end there is a feeling that we are all fighting for the same cause."

Simon Lhoest

Born and raised in Belgium, Simon Lhoest is a BAEF Postdoctoral Fellow at the Center for Biodiversity Outcomes at ASU. Since 2015, Simon has been a conservation biologist focused on biodiversity management and conservation in central Africa. He has designed and conducted interdisciplinary work to improve the assessment of biodiversity and ecosystem services in Cameroon, Democratic Republic of Congo, Republic of Congo, and Gabon. Simon's postdoctoral research at ASU is focused on the science-policy interface for wildlife conservation. He works to improve protected area management by analyzing and designing actionable science for all conservation stakeholders, involving private and public sectors in close collaboration.

Why did you choose to conduct postdoc research at CBO?

"I came to ASU to further develop my research methods in actionable science. Conducting research here at CBO has helped me prepare better interview questions and has improved my ability to analyze data qualitatively. In the past, I focused on producing statistics and charts. Now I use mixed methods, which has broadened my research for the benefit of both people and nature."

"I came to CBO because I resonated with Leah Gerber's vision - what we need now is not more data but better ways of connecting it with decision making."



What inspired you to work in conservation?

"When I was a kid, I had pictures of African wildlife all over my room, but not many people around me believed my interests could become a career. When I grew up, I became part of a large network of nature lovers, and saw that there were opportunities to work in wild places like Africa. I could have stayed in Belgium but I wanted to go somewhere with big challenges and big things to do."

What surprise benefits have you gained while working with scientists at CBO?

"In the US, conservationists work in a constructive manner - they bring their expertise and experience to the table and build something together. It's a different working culture than the European Union (EU), where conservationists tend to critique rather than collaborate. I hope to bring ASU's supportive conservation culture to the EU and beyond."

Erin Murphy

Erin is a marine conservation ecologist and a fourth-year Ph.D. candidate in ASU's Biology and Society Program. Her work aims to develop sustainable and equitable solutions to marine conservation challenges by bridging the gap between research, policy, and management. Currently, Erin is focused on marine plastic pollution and sustainable fisheries. Her dissertation explores the impacts of plastic pollution on marine ecosystems, and evaluates the efficacy, cost, and trade-offs of different intervention strategies to identify the best policy solutions. She is currently conducting research in Hawaii. After completing her Ph.D., Erin hopes to continue working at the nexus of research and policy in marine conservation.

What brought you to CBO and why did you decide to focus on plastics?

"After being at the EPA, I decided I wanted to come back for my PhD and do research that was specifically trying to answer the questions that policymakers have. For instance, a lot of scientific research isn't necessarily well-suited for directly informing policy, and so I wanted to ask very targeted science questions that thought about the regulatory frameworks we have and how we could actually implement research to achieve outcomes. And I chose plastic pollution because it is a hot topic in terms of land-based pollution and it's also incredibly complicated. Plastic is globalized, every person plays a role, and it has a complex ecological life in the environment. So plastic is really interesting to me as a study system, and it also presents one of the bigger challenges in terms of how we can integrate social-ecological systems and thinking into addressing conservation issues."



How has working with CBO benefitted your research?

"One main benefit is CBO's network and applied approach. CBO is unique compared to a lot of research opportunities or research groups. CBO has partnerships with government officials and nonprofits that allow for more conversation about what applied science looks like. Right when I started at CBO I got to work on an interdisciplinary panel and paper on plastic pollution. It included government officials, nonprofits, academics and companies - people from different lenses coming together to talk about these issues. That experience really helped me actualize a lot of my thinking around how to do transdisciplinary science and applied science. CBO created the structure that made this kind of work possible."

What would you say to those who are interested in supporting the work CBO is doing?

"Get involved. There is so much good work being done at CBO and there are so many great researchers involved. If you're interested in the work, there's a lot of space to collaborate and create together to achieve shared outcomes that have an impact."

Girls Conserve

The Program: A STEM mentoring program for high school girls to gain skills in leadership, community and team building, career growth, and professional development. The program recognizes and supports the interconnection between people, animals, plants, and a healthy environment. This approach also addresses socio-economic contexts that contribute to and are affected by poor environmental quality, biodiversity loss, and poor general health outcomes. Girls engage in interdisciplinary learning and curricula that are place-based, culturally responsive, and resonate with diverse communities. They are mentored by fellow women in STEM through multi-generational engagement (faculty, graduate, and undergraduate students).



Featured Projects - Marine Conservation

Mitigating plastic waste

The Project: Quantifying the impact of different intervention strategies aimed to reduce the flow of plastic pollution into the environment.

Marine plastic pollution is a global problem affecting marine life, habitats, and humans that depend on these ecosystems. Micro- and macro-plastics cause physical and chemical harm to marine systems and humans. Our lab researches plastic pollution, ranging from data collection to the social and ecological issues impacted by different interventions. Several of our lab members work with the Plastic Pollution Emissions Working Group, funded by The National Socio-Environmental Synthesis Center.

Coral reef conservation

The Project: Determining the conditions and processes that improve coral reef ecosystem health globally.

Our coral reef conservation work focuses on quantifying the long-term impacts of land-based pollution on coral reef ecosystem health (from historical data on land use, reef water quality, and coral growth rates). This work aims to improve coastal watershed management and quantify the human and environmental drivers of coral reef ecosystem health globally. This research will also determine the conditions that allow for future reef persistence while also integrating historical data into coral reef fisheries and watershed management.

Sustainable fisheries

The Project: To help sustain fishery supply chains by conducting a comprehensive assessment of fishery eco-certifications and identifying how fishery operations and governance impact supply chains.

We aim to bring our scholarship on market-based wildlife conservation approaches to help sustain fishery supply chains. Our first step is to assess existing eco-certifications relevant to the fishery sector. Assessments would identify commonalities and differences in how fisheries assess materiality, measure progress, and are governed.

Marine spatial planning

The Project: Supporting the development of effective marine conservation strategies and improving marine reserve planning by examining the impacts of warming and acidification on marine ecosystems.

We assess the impacts of temperature and ocean acidification on marine conservation activities. Recent evidence suggests that changes in ocean temperature and pH may profoundly impact larval dispersal and population connectivity. Yet, implications of ocean change for marine reserve planning remain largely unexplored outside coral reefs. Currently, we are examining the relative and interactive effects of warming and acidification on the probability of dispersal in marine systems. This work is critical to developing effective conservation strategies in a changing world.





Featured Partnerships

Conservation International

This initiative aims to develop a transparent, data-driven decision support tool that Conservation International can use to target funding to projects that maximize conservation outcomes.

Investing in green business has the potential to achieve multiple sustainable development goals as it promotes economic benefits and reduces industry impacts on biodiversity. The first phase of the project develops a method to identify tradeoffs in investment for two agricultural green industries in the Ucayali and San Martin regions of Peru. The aim is to develop the tool's capabilities so that it can be used by the industry to support decisions about where to act and to report on the conservation benefits of action.

The partnership's goals are threefold: 1. protect biodiversity. 2. promote sustainable development, particularly in food production and fisheries. 3. train the next generation of conservation biologists

“Our partnership with Conservation International is a mechanism to integrate scholarship across campus in interdisciplinary teams to tackle (those) three general goals,” Gerber said.

Bayer - Pesticide Risk Assessment

This initiative aims to enable confident assessment of how agricultural pesticides impact endangered species.

The current pesticide registration and registration review process has been historically opaque and time intensive, without evidence that endangered species are being effectively protected. We are working to improve the efficiency and transparency of pesticide registration and review. As a first step, we have been exploring how to increase efficiency and

transparency, and to create confidence that registered pesticides do not hinder the recovery of endangered species. So far, this work has detailed drastic efficiency improvements in species risk assessments. We aim to build on this work by developing a ranking metric that (1) identifies the species most at risk from pesticide exposure and (2) supports decisions about prioritizing pesticide reviews.

Past Accomplishments

Electric Power Research Institute (EPRI)

For the electric power industry, it is especially important to preemptively estimate the costs of compliance in regard to actions affecting endangered species and those under consideration for the Endangered Species Act (ESA) listing. Critical to the success of the ESA is engaging with the private sector to understand how biodiversity conservation and business practices can be complementary and synergistic. Understanding these costs allows companies to make informed decisions around regulatory risks associated with the ESA.

We developed a tool to estimate the range of potential operational, reputational, legal and regulatory risks associated with ESA compliance for the electric power industry through our collaborations with EPRI. Our evidence-based framework facilitates the assessment of pre-compliance and compliance costs. This tool provides critical value to decision-making in the private sector (e.g., providing cost-efficiencies, reduction of regulatory risk, enhanced stakeholder reputation), and increases awareness of sustainable practices.

Recovery Explorer tool co-development with FWS – funded by SESYNC

We developed a prototype decision support tool for the US Fish and Wildlife Service (FWS) to explore the benefits of cost-efficient project ranking for endangered species recovery. This tool can be parameterized to best fit the decision needs of regional and headquarter level users and requires development and implementation plan for rollout within the agency.

Quick Facts

Impact: CBO is a globally recognized conservation research organization that partners with NGOs, governments, and corporations to address the world's biodiversity crisis. We develop unique and effective conservation tools that help improve decision-making across multiple sectors.

Thought leadership: CBO has become a recognized provider of creative conservation solutions. In 2021, CBO's work has been featured in the media: NPR, NY Times, The Atlantic, and others. CBO leadership also recently delivered U.S. Congressional testimony on the state of biodiversity.

Scholarship: CBO leaders have pioneered new approaches in conservation planning and management. Our team's research has been published in top tier journals, informing conservation science around the world.

Funding: Since CBO's inception in 2014, we have generated approximately \$10M in external funding.



Looking Ahead

The Center for Biodiversity Outcomes partners with key local, national and global organizations to advance biodiversity conservation research and education.

Some of our partnerships include:



We need help from friends like you!

Your donations fund science-based solutions and help us train the next generation of conservation leaders. Learn more about our programs and initiatives, and contribute to our efforts at:

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