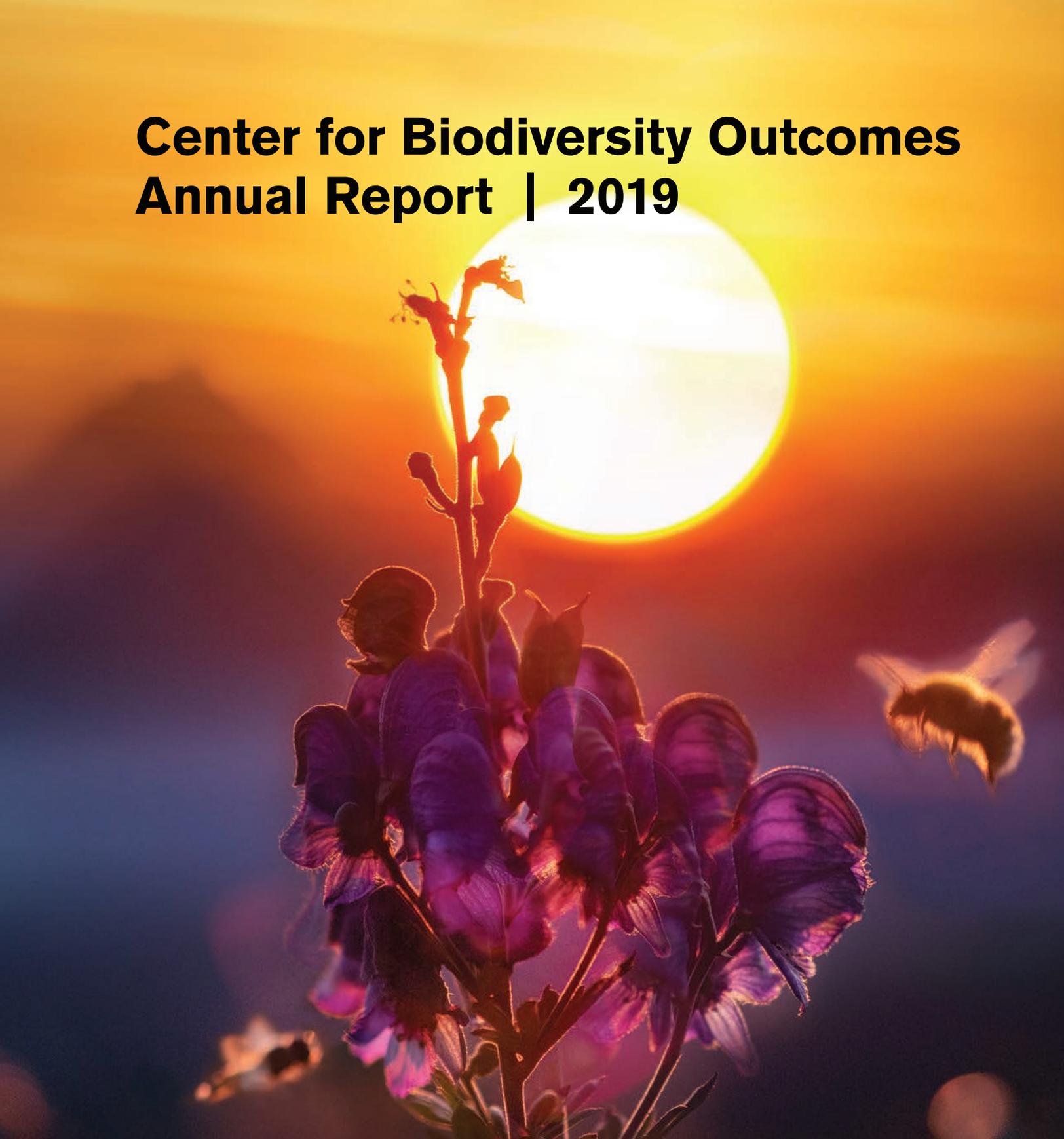


Center for Biodiversity Outcomes Annual Report | 2019





We envision a world

where the diversity of life on Earth
is valued and sustained for the benefit of all

Our mission is to enable

discoveries and solutions

to sustain Earth's biodiversity

in a time of rapid biophysical,

institutional and cultural change.

Inside this report

- Letter from the founding director 4
- Meet the team 6
- Our approach 8
- Our values 10
- Research 12
- Education and diversity 20
- Partnerships 28
- Operations 38
 - Funding 40
 - Events 42
 - Marketing and communications 46
 - Team updates 52
- Future direction 54
 - 2020 goals and metrics 56
- Contact information 58



Access this report online at biodiversity.asu.edu/about

Letter from the founding director

Everything that supports civilization — including agriculture, clean air, the delivery of adequate supplies of freshwater, and our economies — depends on diverse and fully functioning ecosystems. Regardless of where we live and what we do for work, we are as tightly tied to the natural world as are fishermen and farmers.

That is why it is so alarming that around one million species worldwide face extinction within the next several decades. This loss will massively disrupt our global support systems and lead us to the edge of a social catastrophe.

“One million species worldwide face extinction within the next several decades.”

There is still time for us to work together to reverse this trajectory. This will require massive societal changes. Not just corporations and other finance sectors, but also consumers, small businesses, national and local governments, NGOs and communities all play key roles.

Three big shifts are needed to make a planetary course correction.

First, those who can afford it must re-think our choices and downshift our consumption patterns to tread more lightly on the Earth. That includes steps like consuming less meat and dairy, conserving water, reducing our use of paper and plastic, using a refillable water bottle, and borrowing or fixing our perfectly good stuff rather than buying new.

Global and national action is crucial to address the challenges to species and ecosystems, but we also need individuals to act en masse if we are to pass a habitable planet on to future generations.

Second, local governments and small businesses must contribute to the solution. Land-use decisions are one of the biggest drivers of species loss. In many countries, those decisions are made at the state and local levels. Many laws, regulations and policies established to mitigate habitat loss also operate at a local scale. Local zoning laws affect whether development sprawls or is concentrated and whether hydropower will choke off a river or allow that river to flow relatively freely. We need to move swiftly toward valuing the preservation of agricultural lands, adopting taxation measures and investment strategies that reward preservation instead of despoliation, and managing private forests in ways that keep them healthy into the distant future.

Third, the private sector is finally responding to the idea that sustainability is good for the bottom line. An increasing number of corporations are acting swiftly and at scale to tackle global challenges such as climate change,

nonpoint source pollution and land degradation because they see getting ahead of these problems is in their best interest, as well as the interests of their customers and local stakeholders.

Arizona State University’s Center for Biodiversity Outcomes has become a global leader in driving progress toward the transformational change needed to protect life on Earth. Continued progress toward these outcomes will require increasing awareness of why biodiversity is important while fostering a greater valuation of biodiversity by all members of global societies.



Leah Gerber
 Founding Director, Center for Biodiversity Outcomes
 Professor, School of Life Sciences



meet the team

Faculty leadership



Leah Gerber
Founding Director



Candice Carr Kelman
Assoc. Ctr. Director of
Conservation Solutions



Samantha Cheng
Assoc. Ctr. Director of
Conservation Evidence



Beth Polidoro
Assoc. Ctr. Director of
Biodiversity Valuation
and Assessment

Operations and communications team



Arielle Amrein
Administrative and
Communications Aide



Linda David
Administrative Assistant



Infynity Hill
Administrative and
Communications Aide



Susanne Hinrichs
Administrative Assistant



Anahi Mendez
Mgr., Communications
and Business Operations

ASU-Conservation International Professors of Practice



Jorge Ahumada



Dave Hole



Miroslav Honzak



Jack Kittinger



Rosimeiry Portela



M. Sanjayan



Percy Summers

Postdoctoral research scholars



Elena Finkbeiner
ASU-Nereus
Project-Conservation
International postdoc



Kelly Gravuer
ASU-The Nature
Conservancy postdoc



Gwen Iacona
ASU-Bayer and Electric
Power Research
Institute postdoc



Lars Iversen
School of Life Sciences
postdoc affiliate



Krista Kemppinen
ASU-Conservation
International postdoc



Aireona Raschke
Research Analyst,
Conservation Solutions
Lab



**Danica Schaffer-
Smith**
ASU-The Nature
Conservancy postdoc

Graduate student workers



Miranda Bernard
Environmental Life
Sciences PhD program



Erin Murphy
Biology and Society
PhD program



**Katie Surrey-
Bergman**
Biology and Society
PhD program



Thank you!

Our deepest appreciation goes to all the students and volunteers who helped advance our strategic goals in fiscal year 2019: Arielle Amrein, Chris Barton, Katje Benoit, Miranda Bernard, Ute Brady, Heather Coates, Kesha Cummings, Sarah Geren, Infynity Hill, Linda Howard, Tiffany Lewis, Reyna Olvey, Chandra Pallavi, Katelynn Reeder, Christina Schmitt and Zafir Somani.



Learn more at biodiversity.asu.edu/people

our approach

Actionable science

Our primary objective is to help mainstream biodiversity in decision-making by:

- **Training the next generation of biodiversity conservation leaders**
- **Bringing biodiversity to the core of the world's decision-making**
- **Transforming biodiversity investments and decision-making**

Our approach engages three dynamically integrated fields: education, research and partnerships. Through our actionable science model, we bridge academia and stakeholders to produce biodiversity conservation science that informs decision-making at local, national and global scales.



Figure 1. Actionable science model

As we implement our actionable science model, we study ourselves to increase our success rate and provide as a scalable model that other institutions can apply across the globe.

Our strengths

We have access to a unique set of tools and resources that allow us to partner with various sectors, including other academic institutions, to address some of the most pressing biodiversity conservation issues of the 21st century.



NGOs	Corporations	Governments
NGOs focus on action. Universities focus on learning. Together we create solutions to pressing biodiversity issues. NGOs often lack the time and resources needed to stay abreast of cutting edge scientific research. The center bridges this gap.	The corporate sector has shown increasing commitment to considering sustainability issues over the past decade. However, many companies lack the data, expertise and incentive to rigorously consider biodiversity in operations. We work with companies to ensure they have the expertise to implement effective biodiversity management plans across their core operations.	Sound environmental policy requires not only cutting-edge scientific data and expert analysis, but also the ability to translate that academic knowledge into the real world. The center offers policymakers a range of services that can help them translate science into meaningful policy decisions.



our values

We embrace the plurality of values that different communities ascribe to biodiversity, ranging from the economic to the cultural, as well as its intrinsic value. This requires a multi-stakeholder, interdisciplinary approach to define the “solution space” for the biodiversity outcomes we seek to achieve.

Our values are aligned with those of The New American University, Arizona State University’s reconceptualization of 21st century higher education. This new concept focuses on the inclusion and success of all its students, as well as social responsibility to the communities ASU serves.

Access

Engagement of stakeholders and decision-makers
Inclusion and diversity

Impact

Focus on human and ecosystem well-being
Solution-oriented

Excellence

Innovation
Transdisciplinarity

Focal areas

Consistent with our objectives, our research efforts are framed within the following three overlapping areas:

Evidence, metrics and monitoring: Developing empirical support for measuring impact and evaluating outcomes, training and capacity building for what constitutes evidence and how evidence can be used.

Decision science and data tools: Creating tools to support evidence-based decisions, working with decision-makers on defining needs for knowledge and decision-making structures, conducting research into how to translate knowledge into action.

Stakeholder engagement: Connecting students and faculty with strategic partners, decision-makers and practitioners.

Topics

We maintain an online inventory of biodiversity research projects covering a variety of topics, including:

- Actionable science innovation
- Advancing corporate sustainability and biodiversity conservation investments
- Biodiversity and the United Nation's Sustainable Development Goals
- Biodiversity science assessments and decision tools
- Broadening diversity and inclusion in science conservation
- Collaborative governance and biodiversity
- Community-based conservation
- Human-wildlife conflict
- Public engagement in biodiversity science
- Public health and biodiversity
- Two faces of extinction: physiological and socio-economical
- Water quality, human health and biodiversity



Goals

Our 2019 research goal was to continue advancing research that informs biodiversity conservation decision-making, by (1) contributing data and tools toward measurable recovery of endangered species; (2) increasing consideration of biodiversity in the private sector and (3) increasing awareness and use of evidence synthesis in conservation decision-making.

Highlights

The following pages highlight some of our accomplishments, including a list of representative publications and reports:

New United Nation's report on biodiversity and ecosystem services

Founding Director Leah Gerber was one of the lead authors of a 2019 UN report on the state of global biodiversity. Although the report offers a grim warning on extinction (approximately one in every eight animal and plant species could vanish completely if humans continue down the same trajectory), Gerber remains positive that this could be the catalyst we need to take individual

and collective action to address climate change, ecosystem fragmentation and natural resource pollution—some of the top factors accelerating species extinction rates. Learn more at bit.ly/2NEidSx and bit.ly/2NEp3rk

Reflections on the United Nations biodiversity report

Founding Director Leah Gerber was interviewed by the Arizona Republic about the 2019 UN report on the state of global biodiversity. Her interview underlines the importance of individual action, along with recommended actions for corporations and governments. Gerber stresses the importance of developing an understanding of our individual and collective role in, and relationship to, the natural world. Learn more at bit.ly/2Lk2cRC

ASU-Chemonics International Conservation Solutions Lab

Candice Carr Kelman, Assistant Clinical Professor of ASU's School of Sustainability and Center for Biodiversity Outcomes' Associate Center Director of Conservation Solutions, became the ASU co-director for this initiative. In 2019, the Conservation Solutions Lab prepared to publish an opinion piece arguing that scientists' participation in conservation efforts is critical. In particular, they must engage with frontline communities (those situated in and around landscapes targeted for conservation) to co-develop solutions, secure funding and implement research conservation efforts. Learn more at bit.ly/2JOQIVn

Health and environmental implications of single-use plastics

Associate Center Director of Biodiversity Valuation and Assessments Beth Polidoro and Faculty Affiliate Rolf Halden were featured in an ASU Now article titled "The inconvenient consequences of a culture of convenience," highlighting the negative impacts single-use plastics are having in our health and the environment. They also addressed current research and initiatives taking place to help turn things around. Learn more at bit.ly/2WlgM9I and bit.ly/36A79ys

How changes in snowpack impact water rights and policy

Faculty Affiliate Abigail York, along with other colleagues from ASU and four other academic and research institutions in three different states, secured a \$4.9 million grant from the U.S. Department of Agriculture to complete a five-year study on this topic. More specifically, they will study (1) how changes in mountain snowpack affect available water; (2) which basins in the arid west are most at risk; (3) how existing water allocation laws and regulations compare to proposed modifications in managing these changes; and (4) how changes in available water, and laws and regulations, affect the economic well-being of various groups in society. Learn more at bit.ly/2NJIW1r

Collaborative governance

Faculty Affiliate Michael Schoon continues to lead research efforts in partnership with Future Earth's Programme on Ecosystem Change and Society to collect and analyze data from local stakeholders on the collaborative governance process for stewardship and use of ecosystems. Collaboration processes assessed in Arizona include forestry, fire and water management. Similar projects look at the challenges of environmental dilemmas in Kenya, Sweden, Canada, Australia, South Africa, Alaska, Puerto Rico and India. Learn more at bit.ly/33MDyyp

Tiny tribe wins lawsuit against the oil industry

Faculty Affiliates David Manuel-Navarrete and Tod Swanson, along with colleague Leah Gibbons, are leading efforts to scale Indigenous Sustainability Field Schools across the Waorani territory in Ecuador, where the Waorani tribe recently won a major lawsuit against the government to protect 7 million acres of Amazonian rainforest from oil drilling. Manuel-Navarrete's project, funded by the Global Consortium for Sustainability Outcomes, is creating green jobs for Waorani families, providing field-based educational opportunities to university students and creating incentives to prevent additional destructive industries, such as palm oil farming and cattle ranching, from entering the area. Learn more at bit.ly/2sLvBh1

Rewilding landscapes for sustainable ecosystems

Postdoctoral Research Associate Krista Kempainen was interviewed by Phoenix NPR member station KJZZ about her Science article titled "Rewilding complex ecosystems." She spoke about the practice of rewilding, which is a method of restoring human-altered landscapes by promoting self-sustaining ecosystems with minimal human intervention. Learn more at bit.ly/34PQ2HQ

Fulbright scholar researches urban climate effects in Greece

Faculty Affiliate Matei Georgescu was awarded a Fulbright Scholar Grant to extend his research into how urbanization affects the climate. Georgescu will spend four months on the island of Crete, working with the Remote Sensing Lab at the Institute of Applied and Computational Mathematics at the Foundation for Research and Technology Hellas. His work will focus on developing high-resolution climate data to illustrate the severity of future extreme heat events in Greece. Learn more at bit.ly/385TVud

Making the most of conservation money

Founding Director Leah Gerber led a team of researchers in developing a tool to help conservation agencies decide how to apply limited resources to conserve the greatest number of species. The budget to protect endangered species is approximately 20% of what is needed to recover listed species, making the

decisions on how to spend the limited funding available even more critical. Gerber's team developed the Recovery Explorer tool in collaboration with the U.S. Fish and Wildlife Services. The tool gives scientists a way to explore the potential consequences of various resource allocation strategies and makes vital aspects of the decision process transparent. Learn more at bit.ly/360x1T3

Should you eat fish from community ponds?

Associate Center Director Beth Polidoro's research into the health implication of eating fish from stock ponds in the Phoenix area revealed that levels of pesticides, chemicals and heavy metals in fish exceed what the Environmental Protection Agency recommends for human consumption. 60% of those who fish community lakes eat their catch, making these results of importance to the Phoenix community and city officials. Learn more at bit.ly/34PQNka

Sand exploitation impacts

Postdoctoral Research Associate Lars Iversen co-authored a paper in Nature Sustainability titled "Promises and perils of sand exploitation in Greenland." The article opens a discussion of the challenges and tensions between protecting the fragile Arctic environment, the local way of life, climate change, and the future Greenlandic economy. Learn more at bit.ly/34igQiQ

New guide helps assess the benefits of key natural areas

Founding Director Leah Gerber and affiliate researchers Penny Langhammer and Rachel Neugarten coauthored a report in the International Union for Conservation of Nature World Commission on Protected Areas that reviews nine assessment services for biodiversity and nature conservation. The report, which is the result of a collaboration by more than 20 international experts, focuses on how these nine tools are applied in key biodiversity areas, natural world heritage sites and protected areas. Learn more at bit.ly/2sqqhPX

New grants to aid endangered species protection investments

The Center for Biodiversity Outcomes received funding from the Electric Power Research Initiative and Monsanto/Bayer to develop tools to help these organizations estimate operational, reputational, legal and regulatory risks associated with compliance with the U.S. Endangered Species Act for their specific industries. These tools will include an evidence-based framework for understanding the cost of compliance and offer critical support in private sector decision-making. Affiliated researcher Gwen Iacona will lead the development of these tools. Learn more at bit.ly/2rRyBle

Citizen scientists help monitor water pollutants

Associate Center Director Beth Polidoro led a citizen science project titled "Community Monitoring of Pollutants in Urban Waterways and Recreational Fisheries in Metro-Phoenix." Over the past two years, the project trained at least 14 undergraduate students in field sampling, water quality monitoring, fish identification and laboratory analytical techniques. More than 45 K-12 students from the Girl Scouts and Phoenix Zoo Teens also participated in sampling and training events. Center for Biodiversity Outcomes Manager of Communications and Business Operations Anahi Mendez designed the ASU-STEM badge, which was awarded to at least 35 of the Girl Scouts. Learn more at bit.ly/33MFFmH

NOAA Marine Debris Program

Associate Center Director Beth Polidoro is leading a Microplastics Risk Assessment with students in the National Oceanic and Atmospheric Administration's Marine Debris Program. The research focuses on microplastics and organic contaminants in seafood from American Samoa. Polidoro and one of her graduate students are continuing to refine the tool, which they hope to deploy in the Caribbean. Learn more at bit.ly/2Rj01S3

Representative publications and reports

Ayers, A. L., Kittinger, J. N., & Vaughan, M. B. (2018). **Whose right to manage? Distribution property rights affect equity and power dynamics in comanagement.** *Ecology and Society*, 23(2):37.

Beaudrot, L., Ahumada, J., O'Brien, T. G., & Jansen, P. A. (2018). **Detecting tropical wildlife declines through camera-trap monitoring: an evaluation of the Tropical Ecology Assessment and Monitoring protocol.** *Oryx*, 53(1):126-129.

Bendixen, M., Overeem, I., Rosing, M. T., Bjørk, A. A., Kjær, K. H., Kroon, A., Zeitz, G., & Iversen, L. L. (2019) **Promises and perils of sand exploitation in Greenland.** *Nature Sustainability*, 2(2):98.

Cheng, S., MacLeod, K., Ahlroth, S., Onder, S., Perge, E., Shyamsundar, P., Rana, P., Garside, R., Kristjanson, P., McKinnon, M. C., & Miller, D. C. (2019). **A systematic map of evidence on the contribution of forests to poverty alleviation.** *Environmental Evidence*, 8(3).

Ferry Slik, J. W., Franklin, J., Arroyo-Rodriguez, V., Field, R., Salomon, A., Aguirre, N., Ahumada, J., et al. (2018). **Phylogenetic classification of the world's tropical forests.** *Proceedings of the National Academy of Sciences of the United States of America*, 115(8):1837-1842.

Gerber, L. R. & Raik, D. (2018). **Conservation science needs new institutional models for achieving outcomes.** *Ecological Society of America*, 16(8):438-439.

Gerber, L. R., Runge, M. C., Maloney, R. G. D., Drew, C. A., Avery-Gomm, S., Brazill-Boast, J., Crouse, D., Epanchin-Niell, R. S., Hall, S. B., Maguire, L. A., Male, T., Morgan, D., Newman, J., Possingham, H., Rumpff, L., Weiss, K. C. B., & Zablan, M. A. (2018). **Endangered species recovery: A resource allocation problem.** *Science*, 362(6412):284-286.

Gravuer, K., Gennet, S., & Throop, H. L. (2019) **Organic amendment additions to rangelands: A meta-analysis of multiple ecosystem outcomes.** *Global Change Biology*, 25(3):1152:1170.

Linardich, C., Ralph, G. M., Robertson, D. R., Harwell, H., Polidoro, B. A., Lindeman, K. C., & Carpenter, K. E. (2018). **Extinction risk and conservation of marine bony shorefishes of the Greater Caribbean and Gulf of Mexico.** *Aquatic Conservation: Marine and Freshwater Ecosystems*, 29(1):85-101.

Marshall, K. N., Levin, P. S., Essington, T. E., Koehn, L. E., Anderson, L. G., Bundy, A., Carothers, C., Coleman, F., Gerber, L. R., Grabowski, J. H., Houde, E., Jensen, O. P., Möllmann, C., Rose, K., Sanchirico, J. N., & Smith, A. D. (2018). **Ecosystem-based fisheries management for social-ecological systems: Renewing the focus in the United States with Next Generation Fishery Ecosystem Plans.** *Conservation Letters*, 11(1).

Naidoo, R., Gerkey, D., Hole, D., Pfaff, A., Ellis, A. M., Golden, C. D., Herrera, D., Johnson, K., Mulligan M., Ricketts, T. H., & Fisher B. (2019). **Evaluating the impacts of protected areas on human well-being across the developing world.** *Science Advances*, 5(4):eaav3006.

Wedding, L. M., Lecky, J., Gove, J. M., Walecka, H. R., Donovan, M. K., Williams, G. J., Jouffray, J., Crowder, L. B., Erickson, A., Falinski, K., Friedlander, A. M., Kappel, C. V., Kittinger, J. N., McCoy, K., Norström, A., Nyström, M., L. Oleson, K. L., Stamoulis, K. A., White, C., & Selkoe, K. A. (2018). **Advancing the integration of spatial data to map human and natural drivers on coral reefs.** *PLOS One*, 13.

Willette, D. A., Cheng, S. H., Greenberg, J. A., & Barber, P. H. (2018). **Rethinking solutions to seafood fraud.** *Frontiers in Ecology and the Environment*, 16(9):499-500.



Learn more about our research at biodiversity.asu.edu/research



Training the next generation

We draw on the intellectual firepower of ASU to train the next generation of conservation leaders. A key aspect of their training includes practicing communicating with non-specialized audiences to increase influence and reach.

ASU faculty and students work in collaboration with other academic institutions to frame problems into workable scientific research questions, to build teams of researchers and to apply existing scientific knowledge to the problems identified by practitioners.

Goals

Our annual education and diversity goals were to:

- Increase enrollment in the Environmental Communication and Leadership Graduate Certificate
- Increase student involvement in center-led research
- Conduct research to identify gaps in conservation leadership training, as well as begin developing and implementing curriculum accordingly
- Contribute to ANGLES (A Network for Graduate Leadership in Sustainability) body of knowledge and community of practice to advance graduate student leadership in sustainability

Highlights

Environmental Communication and Leadership Graduate Certificate

Students continued to apply to this graduate certificate, which we launched in fall 2017 (see promotional flier and list of approved coursework on pages 24-25). This certificate is designed to train graduate students in science-based fields to effectively communicate their findings to public audiences and decision-makers. We are currently offering this certificate across all campuses. During fall 2019, 10 students enrolled in the main course. Learn more at bit.ly/2OMmmG4



The Nature Conservancy NatureNet Science Fellowship

We are pleased to announce the renewal of our collaboration with The Nature Conservancy to offer the NatureNet Science Fellowship. ASU joined Cornell, Columbia, Princeton, Stanford, Yale and the University of Pennsylvania with a shared goal of supporting early-career scientists researching the interface of science, technology and business to achieve biodiversity outcomes.

We welcomed Danica Schaffer-Smith, our 2018-2020 NatureNet Science Fellow. She is using remote sensing and hydrological modeling to answer questions about floodplain resilience in eastern North Carolina. Firstly, she is quantifying risks to water quality under extreme weather events and assessing the distribution of potential impacts on vulnerable human communities and aquatic systems. Secondly, in collaboration with the U.S. Geological Survey, she is identifying the best places to implement nature-based solutions to reduce flooding and improve water quality that support both nature and people.

Preliminary results have been presented at the annual meeting of the American Geophysical Union, as well as with a variety of stakeholders engaged in ongoing disaster relief and resilience planning. Danica is mentored by ASU faculty Daoqin Tong and Soe Myint with the ASU School of Geographical Sciences and Urban Planning and Rebecca Muenich with the ASU School of Sustainable Engineering and the Built Environment.

NatureNet Science Fellow Kelly Gravuer joined the team in September 2016 and concluded her fellowship in September 2018. Gravuer investigated how food production areas can assist in climate mitigation while continuing to support other important goals such as biodiversity conservation and water quality. She completed several research projects, including a greenhouse project involving multiple ASU undergraduates and a survey of agricultural professionals to investigate challenges and opportunities in the adoption of new practices.

Her projects involved collaborations with teams at TNC, as well as with other conservation practitioners and academics through the Science for Nature and People Partnership. This past year, Gravuer also presented her work at the Ecology of Soil Health Summit and co-developed outreach activities for ASU's Earth & Space Exploration Day. During her time at the Center for Biodiversity Outcomes, Gravuer was primarily mentored by Associate Professor Heather Throop, with additional mentoring from Associate Professor Hallie Eakin and Professor Scott Collins. Learn more at bit.ly/2B0N9J2

TRAINING OPPORTUNITIES

Associate Center Director of Conservation Evidence Samantha Cheng led a training workshop on **systematic mapping methods for conservation and environmental science** held with students from Duke Marine Lab and ASU graduate and undergraduate students at ASU Tempe campus.

Associate Center Director of Biodiversity Valuation and Assessments Beth Polidoro spearheaded a citizen science project titled "**Community Monitoring of Pollutants in Urban Waterways and Recreational Fisheries in Metro-Phoenix.**" Fourteen undergraduate students were trained in field sampling, water quality monitoring and fish identification. In addition, more than 45 K-12 students from the Girl Scouts and Phoenix ZooTeens participated in sampling and training events in the Phoenix Metro area.

Polidoro helped conduct a 12-week summer REU on **Marine Conservation Genetics and Biology** for six students from ASU, ODU, Texas A&M and Rutgers University under an NSF PIRE award at Silliman University in the Philippines in June 2019.

The **ASU-Smithsonian Tropical Research Institute** offered two types of scholarships for students to learn about tropical science in Panama: (1) Tropical Ecology and Conservation Boot Camp (January 13-February 6, 2019) and (2) ASU Tropical Biology Abroad Course (June 4-21, 2019).

DIVERSITY AND INCLUSION

Fostering diversity within the conservation space is one of our core values. We are pleased to continue collaborations with internal and external partners in engaging new minds and talents to arrive at innovative solutions for the future.

Founding Director Leah Gerber traveled to Hawaii with the **Center for Gender Equity in Science and Technology** Director Kimberly Scott to meet with constituents from local educational institutions and NGOs, including the Girl Scouts. This visit intended to begin developing synergies to help underrepresented girls thrive in STEM.

Gerber also joined our existing partner **ANGLES** as an advisory member. ANGLES is a network dedicated to supporting graduate students engaged in conservation careers. It fosters inclusivity, diversity and career development.

Gerber also mentored Annelise Basha, an eighth-grade student from **Summit School** of Ahwatukee, who represented the center at various outreach events during spring 2019—including a tour of the Phoenix Public Works Transfer Stations—as part of a marine conservation project. Learn more at bit.ly/34OhWUm

Faculty Affiliate David Manuel-Navarette from the School of Sustainability taught a course titled "**Indigenous Sustainability Solutions: Leveraging Indigenous Languages to Enhance Amazonian Biocultures**" (SOS 588). This class was instituted as part of the UN's International Year of Indigenous Languages (2019).



Learn more at biodiversity.asu.edu/education

Open to all graduate students across ASU

Graduate Certificate in Environmental Communication and Leadership

This certificate trains graduate students in environmental sciences to communicate their findings to the broader public and decision makers. Graduate students will obtain valuable training in leadership and will learn to communicate with public, media, policy makers and other relevant stakeholders.

Students will learn to:

Effectively communicate with the public, including media and decision-makers, to translate complex technical and scientific concepts into easy to understand language.

Demonstrate leadership skills such as strategic thinking and planning, team management, conflict resolution, collaboration, mentorship and self-reflection.

Inform policy and decision-making for an organization, governmental body or other institution by describing their goals and incentives.

Requirements:

BIO 578 Environmental Leadership and Communication (3 credits) is the core course for this 15 credit hour certificate. This course is designed to build skills specific to environmental policy and management (offered every spring).

Students will complete 12 additional credits of coursework from our approved course list in the areas of policy and management, communication and leadership.

To apply, you need:

1. Official transcripts
2. CV

biodiversity.asu.edu/education

Elective coursework for the ECL graduate certificate

Students enrolled in the Graduate Certificate in Environmental Communication and Leadership can complete their 12 additional credits of coursework from the following approved list of courses:

Policy and management

Course number	Credits	Course title
BIO 517, SOS 518	3	Uncertainty and Decision Making
BIO 412, BIO, SOS, GPW 598	3	Conservation in Practice
ERM 528	3	International Environmental Management
ERM 540	3	International Environmental Law and Policy
HSD 501	3	Science and Technology Policy
HSD 502	3	Advanced Science and Technology Policy
PAF 505	3	Public Policy Analysis
PAF 540	3	Advanced Policy Analysis
SOS 545	3	Topic: Organizations, Sustainability and Public Policy
PAF 545	3	Organizations, Sustainability and Public Policy

Communication

Course number	Credits	Course title
SOS 598	3	Communicating about Sustainability
SOS 577	3	Interdisciplinary Writing Seminar
SOS 545	3	Organizations, Sustainability and Public Policy
PRM 470	3	Environmental Communication
COM 414	3	Topic: Crisis Communication
CMN 598	3	Topic: Environmental Risk and Communication Advocacy

Leadership

Course number	Credits	Course title
SST 591	3	Topic: Transformational Leadership and Embodied Activism
MGT 513	3	Mindful Leadership
MGT 545	3	Becoming Leaders Who Matter
NLM 560	3	Leadership and Ethics in the Nonprofit Sector
PAF 508	3	Organization Behavior
PAF 529	3	Organization Change and Development
PAF 574	3	Diversity, Ethics and Leading Public Change

FACULTY ENGAGEMENT

Because innovative solutions require diverse perspectives, we partner with a range of faculty across ASU to conduct research that sheds light on biodiversity conservation issues. In 2019, 13 new faculty members joined as affiliates. We currently have 138 affiliates from over 25 different units across the university.

The majority of our faculty affiliates come from the School of Life Sciences, the School of Sustainability, the School of Human Evolution and Social Change and the School of Earth and Space Exploration.

STUDENT ENGAGEMENT

Since the center was founded in 2014, we have completed 38 student hires from six different schools across the university. Our students engage in a variety of projects including scientific research, communications and marketing, project management and event planning.

We assign students to projects that align with their career interests and provide them 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.

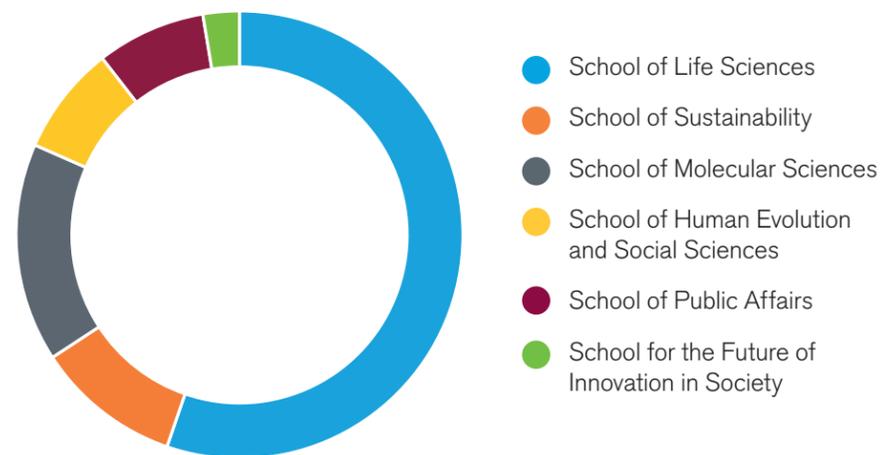


Figure 2. Student workers engagement by school, FY15-FY19



We also continue to support **Nature at ASU**, an undergraduate student-led initiative aimed at helping nature conservation career students connect with resources and opportunities inside and outside ASU. We contributed \$2,000 to support their daily operations in 2019 and provided designated student workspace in the center's administrative suite (LSA 351A). Learn more at bit.ly/33Mhtkz

Affiliated graduate students **defended their theses**, covering research topics in biodiversity conservation, whales, coffee and seaweed. Learn more at bit.ly/2YfrRzO

Affiliated graduate students had the opportunity to **travel to conduct research** during summer 2019 as part of affiliated projects. Learn more about their experiences in the **Ecuadorian Amazon** (visit bit.ly/2rQ5ZiE), **Panama and Peru** (bit.ly/2RiCHni)

Additionally, we promoted a research experience for undergraduate students in 2019 to travel to the **Philippines**. This project was sponsored by the Mathematics and Natural Sciences. Learn more at bit.ly/2Yi7hz8

COMMUNITY OUTREACH

We attended the **Second Annual OdySea Aquarium Conservation Expo** and facilitated hands-on activities designed to help people of all ages better understand how seafood consumption options affect marine life ecosystems.

We also hosted a table at **ASU's Open Door** with activities to educate local families on sustainable seafood, plastic pollution and marine biodiversity loss.

partnerships



We are able to generate and apply innovative research to solve real-world problems thanks to our multiple collaborations with NGOs, corporations, governments and other academic institutions.

We operate a needs-driven model, informed by our partners' inquiries and the pressing conservation challenges we face.

Our goal is to continue establishing and cultivating partnerships to increase our impact and reach.

Together, we will:

- Contribute research data that informs decision-making
- Facilitate opportunities to train the next generation of conservation leaders
- Continue connecting a global network of biodiversity conservation knowledge producers with knowledge users

Highlights

Below are some of our accomplishments through partnerships. Please refer to the research and education sections for additional content:



CHEMONICS INTERNATIONAL

Chemonics International is a private international development company that works for donors and the private sector to manage projects in developing countries. Their mission is to promote meaningful change around the world to help people live healthier, more productive and more independent lives.

We have partnered with Chemonics to create the **Conservation Solutions Lab**, a collaboration dedicated to the effective and equitable engagement of communities in conservation. In 2019, Candice Carr Kelman joined the Center for Biodiversity Outcomes as associate center director of conservation solutions, spearheading the Conservation Solutions Lab. Aireona Raschke transitioned out of her role as a research analyst with the Conservation Solutions Lab and is currently working as a program director with the **Central Arizona Conservation Alliance, Desert Botanical Garden**.

The Conservation Solutions Lab hosted a workshop in Washington, D.C. at Chemonics headquarters with the nascent lab's network. This network is comprised of participants from major conservation organizations, government agencies, funding agencies (including the **U.S. Agency for International Development**), development consulting firms and universities. At this workshop, we presented the results of a recent evidence synthesis on community engagement in conservation and discussed what was needed for a paradigm shift in the way conservation works with people. We secured commitments for participation in thought leadership and development from our partners as well as several ASU faculty and Chemonics staff.

Learn more about the Conservation Solutions Lab at bit.ly/2M1gua6



CONSERVATION INTERNATIONAL

Conservation International is a U.S.-based NGO that works in more than 30 countries across six continents to protect the natural resources people rely on through an innovative blend of science, policy and partnership.

The ASU-CI partnership was established in September 2016. The partnership delivers transformative and measurable outcomes across three goals:

(1) protect 1 million hectares of natural capital; (2) transitioning 100 million food producers to sustainable methods; and (3) training the next generation of conservation leaders.

After the success in its first year, we were thrilled to continue the ASU-CI joint course titled Biodiversity Conservation in Practice. In its second semester, 40 undergrad and graduate students across the School of Sustainability and School of Life Sciences enrolled. Co-taught by six professors of practice and supported by Teaching Assistant Miranda Bernard, this course granted students the unique opportunity to learn from global field practitioners to better understand the opportunities and challenges conservation organizations face. We look forward to offering the class again in spring 2020.

To achieve the goals of the partnership, we developed a fundraising strategy with the **ASU Foundation**. The professors of practice will submit additional collaborative proposals of at least \$1 million each year.

Since this partnership launched in September 2016, it has grown into a keystone university-wide collaboration. To continue supporting its growth, management of the partnership transitioned to **Knowledge Enterprise – Corporate Engagement and Strategic Partnerships** in late 2018.

In 2019, we continued to play a pivotal role in CI's success by supporting professors of practice engagement, training affiliated students and postdoctoral research associates, facilitating faculty and CI scientist collaborations, providing operational and communications support, as well as continued to study and scale up the partnership so it can serve as a replicable model for other cross-sector collaborations.

2019 saw new and exciting collaborations for Conservation International. CI, the **University of Guyana** and the **ExxonMobil Foundation** established a partnership to advance sustainable employment and conservation in Guyana. CI has extensive experience working in the region, having protected almost three million acres of land and improving the livelihoods of more than 50 indigenous communities. The program will focus on supporting sustainable development through investment in education, research, management of natural resources and protecting Guyana's ecosystems.

CI also joined forces with the **ASU Design Theater** in the creation of a tool that guides decision-makers in policy interventions around land degradation. The tool classifies and quantifies land degradation in a given area, offering policy-makers useful information about potential interventions.

Leah Gerber and CI's Americas Field Division Senior Vice President Dr. Daniela Raik co-authored a paper entitled "Conservation science needs new institutional models for achieving outcomes," (bit.ly/3dwDj1t) calling for cross-sector collaborations to tackle our most pressing conservation challenges. The paper stresses the importance of collaborations that include stakeholders outside of academia and of making conservation science accessible to these stakeholders, both of which would address the "research-action" gap in conservation.

ASU-CI postdoctoral research associates

Elena Finkbeiner completed her term at ASU, where she conducted work in developing fisheries with strengthened sustainability and social responsibilities. She continues to collaborate with us in her new role as a full-time staff member at Conservation International. This project was co-sponsored by **The Nippon Foundation's Nereus Project** at the **University of British Columbia**.

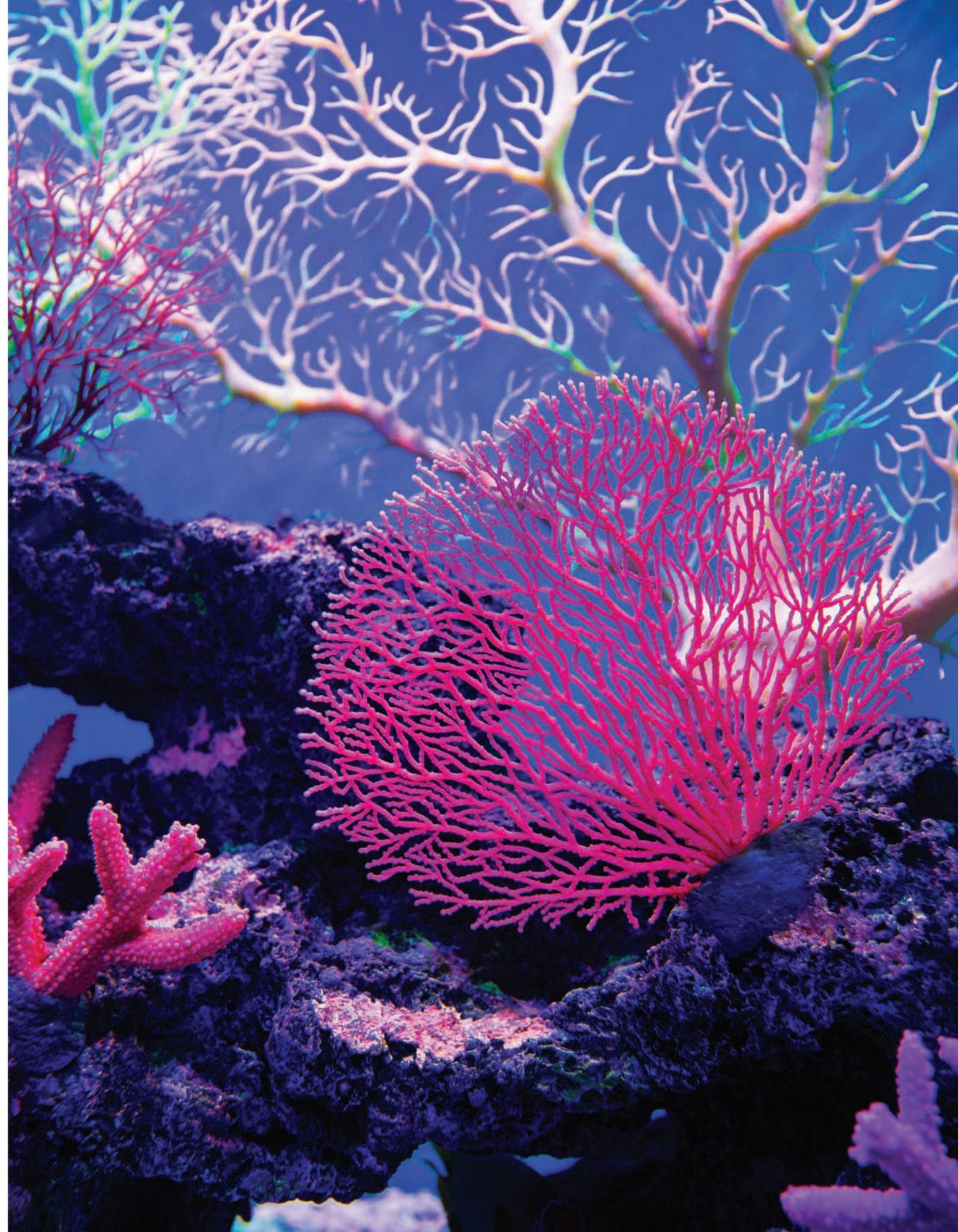
Krista Kemppinen's work reviewing the allocation and effectiveness of global conservation funding, with colleagues from the **University of Illinois Urbana-Champaign** and the **University of Cambridge**, was recently presented at **The Society for Conservation Biology's** 29th International Congress for Conservation Biology. Her work quantifying the potential contribution that reforestation interventions globally could make to biodiversity conservation, with colleagues from CI and **Oregon State University**, is under review for publication. Other work has included: (1) co-leading and co-developing a graduate research project (six ASU students) seeking to inform under what conditions freshwater ecosystem services might positively contribute to development and conservation objectives; (2) co-developing a prototype decision-support tool for allowing visualization of the biodiversity impact of alternative levels of conservation investment (including for different values of socioeconomic pressures), based on an existing mathematical model; and (3) contributing to research projects on conservation communication and conservation decision making.



IUCN RED LIST OF THREATENED SPECIES

The **International Union for Conservation of Nature** Red List of Threatened Species is the world's standard for quantifying species extinction risks. It is used around the world to inform policy, planning and conservation action. The Red List includes details on threats to species, their ecological requirements, geographic distribution and information on how to reduce or prevent extinctions.

The IUCN Red List of Threatened Species Partnership is a selective group of 10 international institutions. ASU is one of only three university partners in the



world to join forces in guiding the scope and application of scientific data for global and national biodiversity conservation. Through this partnership, we are devising strategies for species conservation and biodiversity decision-making. This partnership is led by Associate Center Director Beth Polidoro.

In 2019, Polidoro was selected as the sole North American representative to the **IUCN Marine Conservation Committee** (iucn-sscmarine.org). In this capacity, she helped draft and submit two international motions for consideration for global adoption at the upcoming **IUCN World Conservation Congress** in June 2020. These include improved conservation and assessment of the world's marine ecosystems (bit.ly/3dveuCV) and improved coordination for the remediation or removal of sunken vessels (bit.ly/2UkuKPJ).

Beth Polidoro, **Northern Arizona University** Assistant Research Professor Helen Rowe and Linda Howard attended the **IUCN Species Survival Commission Leadership** meeting in Abu Dhabi, in October 2019. Funded by the **United Arab Emirates Environmental Agency**, this meeting takes place every four years to create strategic plans for different IUCN species specialist groups, as well as to work on meeting and creating new targets for the **Convention on Biological Diversity** and other international biodiversity conservation initiatives.

In 2019 we continued extinction risks assessments of the world's eels, as well as initiated reassessments of the world's coral reefs, reef-building corals and tunas. To this end, we hired a postdoctoral research associate, Krista Kempainen, and a consultant, David Shiffman. We also have four undergraduate students working on these projects. We received a grant of \$27,000 from the **IUCN Partnership Committee** to initiate this marine reassessment work, with matching funds of \$45,000 from **ASU's New College of Interdisciplinary Arts and Sciences**.

For the IUCN Red List of Ecosystems, we are currently reviewing the new partnership agreement with ASU's New College. With funding from the **PLuS Alliance**, we have finalized the IUCN Ecosystem Typologies (bit.ly/2WOILYG), for which the methods and additional analyses are currently under review in the journal Nature.

We are also continuing to support the **Sonoran Desert Plant Specialist Group**, through PhD student Linda Howard, the new Red List Authority for this group, and by providing assessment training and advice for the new co-Chair, Professor Rowe, who is now managing 11 undergraduate students at NAU.

Additionally, we are planning a study abroad program for undergraduate students to attend the World Conservation Congress in Marseille, France, in June 2020.

→ PLASTIC POLLUTION EMISSIONS WORKING GROUP

We joined efforts with the Plastic Pollution Emission Working Group (PlasticPEG), an initiative of the National Socio-Environmental Synthesis Center.

The amount of research surrounding marine plastic pollution has drastically increased in the past decade, highlighting the scale of the problem. Microplastics have been found in birds, fish, bottled water and even table salt. Yet, their impacts are not well understood.

As a result of PlasticPEG's collaborations with multiple sectors, they launched a new website containing research on the impacts of specific global and local intervention strategies to reduce plastic pollution, including their level of effectiveness on an overall scale. PlasticPEG's goal is to develop a model that captures the flow of plastics from production through various waste streams. By understanding these pathways, the group will be better equipped to implement effective mitigation strategies.

In addition to the website, PlasticPEG members published a white paper titled "Evaluating the impact of mitigation strategies for marine litter and microplastics to inform policy." This publication was uploaded to the Ad Hoc Open-Ended working group on marine litter and microplastics. Learn more at bit.ly/2RVtnWY

→ THE NATURAL CAPITAL COALITION

The Natural Capital Coalition is a unique global multi-stakeholder collaboration that brings together leading initiatives and organizations to protect natural capital and promote sustainable development. In June 2017, we joined other 250 NCC member organizations.

As a member, we are working with NCC to develop biodiversity and ocean supplements to the Natural Capital Protocol. This partnership complements existing partnerships with the **World Business Council on Sustainable Development** and Conservation International, informing a standardized approach to measuring natural capital.

In 2019, we co-hosted a workshop at ASU to support the development of the NCC ocean supplement. We presented case studies from **Bank of America**, **Scottish & Southern Energy** and **Metropolitan Touring**. This workshop had three primary goals: (1) discuss and challenge the scope/focus of the NCP for the Ocean; (2) identify the demand for the work, business problems to be solved and the value proposition for this work; and (3) engage champions from

key sectors and stakeholder groups. As a result, a guiding document titled “The Value of the Ocean” has been generated and is currently under revision for publication and public distribution. Learn more at bit.ly/2PPfYNU



Learn more at biodiversity.asu.edu/partnerships



SMITHSONIAN TROPICAL RESEARCH INSTITUTE

The Smithsonian Tropical Research Institute was established to improve knowledge about the past, present and future of tropical ecosystems and their relevance to human welfare. In 2018, we joined other ASU units to launch a five-year collaborative research initiative in partnership with the STRI in Panama. This ASU-STRI effort follows a successful earlier partnership that finished in 2015. ASU-STRI aims to cultivate a shared research agenda to understand and manage human and ecological systems in the tropics and to train the next generation of tropical scientists.

Specific research foci include (1) resilience, adaptive evolution and the effects of changing environments on plant, animal and microbial phenotypes, as well as community and ecosystem functions; and (2) integrating biological data with socio-economic models to sustain biodiversity during climate change and human development.

In spring 2019, ASU-STRI announced a call for research proposals for team-building visits (up to \$4,000 for travel and lodging expenses in Panama) and workshops (\$20,000 to convene at ASU and STRI) to take place in Panama. ASU and STRI researchers, including faculty, research associates, postdocs and graduate students were able to apply.

In addition, ASU-STRI sponsored graduate students to attend the Tropical Ecology and Conservation Bootcamp, which took place in Panama from January 13-February 6, 2019, and the ASU Tropical Biology Study Abroad Course, which ran from June 4-21, 2019.

operations

The work we do would not be possible without a strong operational structure. We rely on a team of faculty, staff, students, volunteers and external advisors to streamline our fundraising, finance, human resources, administrative, marketing and communications, outreach, reporting and project management efforts to achieve our strategic goals.

In 2019, some of our key operational goals included: (1) successful transition to the university's new financial management system; (2) developing tailored manuals for each operations team member; (3) supporting personnel transitions, such as recruitment, on-boarding, career development and exiting; and (4) define and communicate our strategy for the next five to 10 years of the center and secure operational funds.

In the following pages, you will see specific goals and accomplishments for each of our operational areas.



Goals and accomplishments

Our 2019 fundraising goal was to request at least \$60 million in external funds via grants and philanthropic support. \$6 million of the \$60 million to be requested would be to fund direct vs. affiliated Center for Biodiversity Outcomes projects. Proposals submitted in partnership with Conservation International would count towards the \$6 million. An additional goal was to secure \$350,000 to support our operations (e.g. personnel, supplies, technology, marketing).

In 2019, we requested a total of \$42,082,588 from external sources. Of the total requested: \$31,632,770 were declined; \$2,999,920 were submitted but not reviewed due to an institutional error; \$5,649,938 were pending response from the sponsor at the time this report was prepared; and \$1,799,960 were awarded.

Proposal title	Sponsor	Amount
The futures of reefs in the Anthropocene	Belmont Forum (Biodiversa)	\$180,000
Estimating costs associated with compliance with the Endangered Species Act	Electric Power Research Institute	\$92,775
Language for sustainability: sustaining biodiversity and biocultures through indigenous language and participation	Global Consortium for Sustainability Outcomes	\$81,700
Incorporating prioritization into endangered species risk assessment and decision-making	Bayer	\$50,000
ASU student support from various grants	Walmart, Biodiversa	\$50,000
Integrated modeling of decision-making and physical critical infrastructure systems in urban areas (Phoenix) to increase resilience to climate events	National Science Foundation-CRISP	\$374,998
Evaluating alternative water institution performance in snow-dominated basin: are food production systems at risk from changing snow water availability?	U.S. Department of Agriculture	\$376,234
Updating global policy with the distinction status of reef-building corals	National Geographic	\$50,000
A decision tool to evaluate ecological and economic impacts of ecosystem based spatial management of the Galapagos Marine Reserve	Lenfest Ocean Fund	\$349,570

Proposal title	Sponsor	Amount
Developing decision tools to inform more biodiversity conservation investments	Johnson Foundation	\$194,703
TOTAL		\$1,799,960

Table 1. FY19 grants awarded

With assistance from strategic communications consultant Bob Lalasz, CEO of Science + Story, we developed a phase two proposal (CBO 2.0) for FY20-FY25, which was presented to ASU leadership. As a result, additional Strategic Initiative Funds were approved to continue supporting our daily operations in FY20, FY21 and FY23. This new SIF support will be reduced by 25% annually, with the expectation that we will be able to operate fully from external funding sources.

The table below shows FY15-FY19 total external funds requested (yellow) vs. funds awarded (maroon) for our direct and affiliated projects. As we have been able to secure multiple grants, we have aimed our focus on advancing current research projects. As existing projects come to a close, our fundraising bandwidth will expand once again.

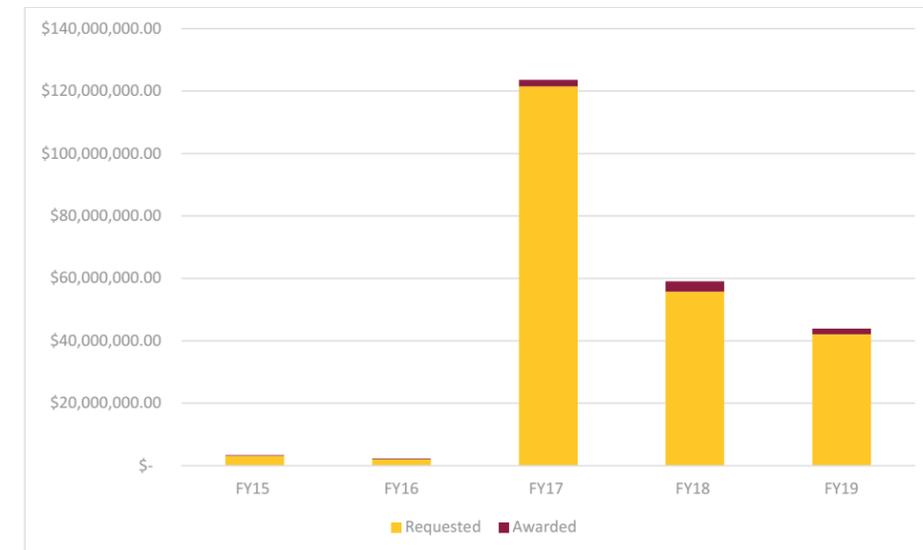


Figure 3. FY15-FY19 external funds requested (gold) vs. awarded (maroon), in USD

➔ **School of Life Sciences Hugh Hanson Seminar Series**

Conservation Oceanography of the North Atlantic Whale (December 5, 2018)

Charles Greene, Director of Ocean Resources and Ecosystems Program in the Department of Earth and Atmospheric Sciences at Cornell University, presented recent research on the North Atlantic right whale, one of the world's most endangered cetacean species. Topics covered included reproductive and mortality rates associated with the existence of other marine species (calanus finmarchicus), as well as unprecedented heatwaves in the Gulf of Maine during recent years. Learn more at bit.ly/38Aj4NM

➔ **Selected conferences, webinars and symposiums**

Casting Biodiversity Conservation as a Budget Allocation Problem (September 10, 2018)

Founding Center Director Leah Gerber attended to help develop a proof of concept that the wealth of academic research and practice on biodiversity indicator development be directly relevant to businesses who are seeking to identify or develop biodiversity indicators. Learn more at bit.ly/34pwB7q

Natural Capital Protocol for the Oceans Workshop (December 7, 2018)

With the Natural Capital Coalition, ASU-Conservation International Professor of Practice Rosimeiry Portela and Leah Gerber presented case studies from Bank of America, Scottish & Southern Energy and Metropolitan Touring. This workshop had three main objectives: (1) discuss and challenge the scope/focus of the NCP for the Oceans; (2) identify the demand for the work, business problems to be solved and the value proposition for this work; and (3) engage champions from key sectors and stakeholder groups. Learn more at bit.ly/2LUFU9a

➔ **ASU events**

The Future of Conservation (August 23, 2018)

Alex Dehgan and Paul Bunje of Conservation X Labs, an innovation and technology startup, discussed the future of conservation science. They posited a necessary shift in the field of conservation science, from descriptive, discovery-based science to applied solutions. Learn more at bit.ly/2RVLk7S

Systemic Risk and Opportunity: Alternative Realities in Social and Ecological Systems (January 15, 2019)

Simon Levin, James S. McDonnell Distinguished University Professor at Princeton University, gave a presentation explaining phase transitions and

their consequences for sustainability efforts and the development of effective management regimes. Learn more at bit.ly/2EkcGML

Risks and Opportunities: Can We Improve Water Quality and Reduce Catastrophic Flooding in the Cape Fear River Watershed, North Carolina Under Ongoing Climate Change? (January 16, 2019)

Danica Schaffer-Smith presented nature-based strategies, using remote sensing and watershed modeling, to address nutrient pollution and flooding in the Cape Fear River Watershed, North Carolina, which has experienced three 500-year storms within two years. Learn more at bit.ly/2RWGLKq

Invisible Wild (January 17, 2019)

Arian Wallach presented research combining ecological science with ethics to promote compassionate approaches to conservation. Specifically, identify non-invasive and non-lethal strategies that enable the persistence of species without causing intentional suffering to individual wild animals. Learn more at bit.ly/2LW8cju



Can Humans and Insects Thrive, Share, and Save the Earth? (January 17, 2019)

Yoram Yerushalmi, Head of the Israel Center for the Expression of Beneficial Insect and Senior Lecturer, Faculty of Biology at the Israel Institute of Technology, presented on the use of beneficial insect species to create a circular economy to better manage our growing needs and minimize our ecological footprint. Learn more at bit.ly/2Ejzyfn

CBS Conservation Series: Organizing Concepts in Biodiversity Conservation (January 30, 2019)

Leah Gerber presented organizing concepts in biodiversity and discussed the importance of these concepts for informing conservation decision-making. Learn more at bit.ly/38GrqDJ

Sharing Space with Nature: Wildlife Corridors in the Urban Desert (February 27, 2019)

Anita Hagy Ferguson, Consultant and Facilitator for White Tank Mountains Conservancy and Leader of the Central Arizona Conservation Alliance Connectivity, White Tank Mountains Conservancy Learning Lab, discussed the importance of biological corridors, urban open spaces and collaborative regional planning, with a critical focus on how humans share space with non-human animals in changing urban and rural landscapes. Learn more at bit.ly/2LYlyLj

Collaborative Conservation: Weaving Together Universities and Nonprofits in the Fight to Save our Planet (March 13, 2019)

Tracy A. Farrell, Vice President of Strategies and Fundraising in the Asia Pacific Field Division at Conservation International, presented on the Greater Mekong Program in Cambodia, where CI is working with government agencies, universities and NGOs to shape policy around freshwater management, ecosystem services and wildlife trade. Learn more at bit.ly/2rNPmUU

External events (participated and promoted)

OdySea Aquarium Conservation Expo (January 19, 2019)

We participated in the Second Annual OdySea Aquarium Conservation Expo, a free event held at the aquarium intended to educate and engage the public. Our activities focused on helping all ages better understand seafood consumption options and how consumer choices impact marine ecosystems. Learn more at bit.ly/34kmX65

Partnership with Planet (April 26, 2019)

Students, faculty and researchers at ASU will soon have access to an unprecedented stream of daily high-resolution images covering Earth's entire



For the fifth consecutive year, ASU has been named the most innovative school in the nation, recognizing the university's culture and groundbreaking research and partnerships, as well as its commitment to helping students thrive in college and beyond.

#1 in the U.S. for innovation

ASU ahead of Stanford and MIT

— U.S. News & World Report, 5 years, 2016–2020

landmass and coral reefs. ASU has partnered with Planet, a San Francisco-based Earth-imaging company, as their first institutional data partner for higher education. Planet operates the largest constellation of satellites in orbit today. This partnership will allow students, faculty and researchers to take advantage of their Dove and RapidEye 3-5 meter data. Learn more at bit.ly/38R2t8K



Learn more at biodiversity.asu.edu/events

Getting the word out

Our 2019 strategic goals were an extension of our commitment to produce tailored, engaging and useful content:

Website: actualize content for value and differentiation

Media calendar: establish a calendar to anticipate coverage

News blog: publish at least one story weekly

Social media: publish at least one organic post weekly

E-Newsletter: write and publish quarterly

Op-Eds or faculty spotlight: publish monthly

Faculty affiliates welcome packet: develop and distribute

Strategy: develop a plan for the next 5-10 years

Report: design a five-year anniversary version



In 2019, we published more than 74 news in our blog, ASU Now and external media. Here are some highlights:

EXTERNAL MEDIA

ExxonMobil Foundation commits \$10 million to sustainability in Guyana
July 3, 2018. Philanthropy News Digest. bit.ly/2raXeQa

Catalyst: Desert animals in urban centers. September 5, 2018. Arizona PBS.
bit.ly/2rOGTQJ

Should it be saved? September 6, 2018. Science. bit.ly/2PaGJeY

Group leads effort to preserve nature in Buckeye. December 12, 2018.
West Valley View. bit.ly/2OMRpl1

Marine Debris Program grantee illustrates microplastics risk assessment research. December 14, 2018. NOAA. bit.ly/2RcfuDo

Who regulates Dolphinaris Arizona? January 7, 2019. 12 News.
bit.ly/2rVbNqR

Should you eat fish from community ponds around Phoenix? Maybe not, study says. March 14, 2019. Phoenix News Times. bit.ly/2OLjWHD

How deadly was Dolphinaris? By today's standards, deadliest in America
May 5, 2019. AZ Central. bit.ly/2RiDQLE

ASU NOW

New report helps conservationists assess how key natural areas benefit humans. August 29, 2018. bit.ly/2OLf18I

The inconvenient consequences of a culture of convenience. October 3, 2018. bit.ly/2PdShOo

Biodiversity conservation needs new partnerships. October 4, 2018.
bit.ly/2Pd2lai

Making the most of conservation money. October 18, 2018. bit.ly/34OI55M

Conservation International partners with ASU's Decision Theater on innovative tool. November 7, 2018. bit.ly/387wOzB

Why biodiversity matters. May 6, 2019. bit.ly/2RhRSa

Pervasive polymers of the deep blue sea. June 7, 2019. bit.ly/2OPaJhz

SOCIAL MEDIA

Twitter

We received an average of 322 monthly visits leading to 117 new followers (820 total) in 2019, a 16.6% increase in followers. Our two-to-three weekly posts (not including Retweets) generated 112,927 impressions (the number of times people saw our Tweets) increasing the potential reach and impact of the conversations.

Per the 2019 Social Media Benchmark Report published by Rival IQ, the average engagement rate per post (the number of times people interact with posts by liking, sharing or commenting) on Twitter was 0.079% for higher education and 0.062% for NGOs. Our engagement average was 0.85%, exceeding once again the rates for both sectors. Learn more at bit.ly/2sKhskI

Facebook

Our Facebook group page, established last year, continued to grow in 2019 gaining 94 new likes. The page was visited 152 times, exposing followers to original content and driving traffic to our website.

YouTube

Our YouTube account continues to grow in content and subscribers. We established it in 2018 and since then it has received 654 views. This translates to a total watch time of 60.2 hours. It currently houses 19 videos including interviews, presentations, short documentaries, promotional material and fieldwork coverage. Check it out at bit.ly/34N5vsa



Stay informed! Visit biodiversity.asu.edu/news



Follow us on social media @BiodiversityASU



WEBSITE

Figure 4 provides a snapshot of our website's (biodiversity.asu.edu) activity throughout the years, per Google Analytics. Although in 2019 there were 152 fewer visitors than the previous year, those who visited the site did so more often than seen before. The average session was 1:56 minutes long. Of the 11,295 people who visited our website in 2019, only 97 were returning visitors.

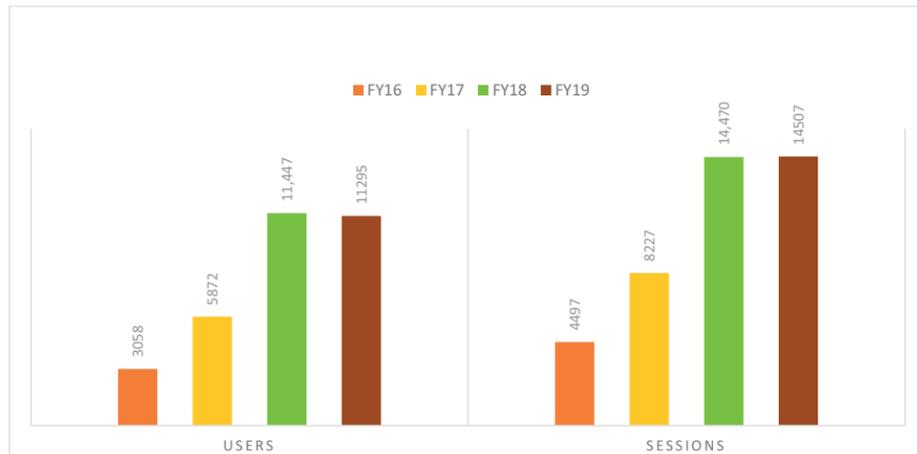


Figure 4. Website traffic comparison for users and sessions

The three countries with the largest number of website visitors were India (40%), the United States (35%) and South Korea (8%).

In addition, the preferred devices used by most site visitors were desktop computers (53%) and cell phones (44.3%). Only 2% accessed our website using a tablet or other electronic devices.

The acquisition channels (ways in which visitors arrived at the site) remained similar to previous years. Per Figure 5, 54% of visitors arrived at the site via search engine results that were not ad campaigns (organic); 38% by directly searching for the site (direct); 4% arrived via social media links (social); 3% via referrals from other websites (referral) and less than 1% via email links (email).

As one could expect, these numbers suggest that as we improve our website's content, providing more general and relevant content to a broad audience, in a way that is concise and engaging such as our "An introduction to biodiversity" segment, our online visibility improves via search engine optimization.

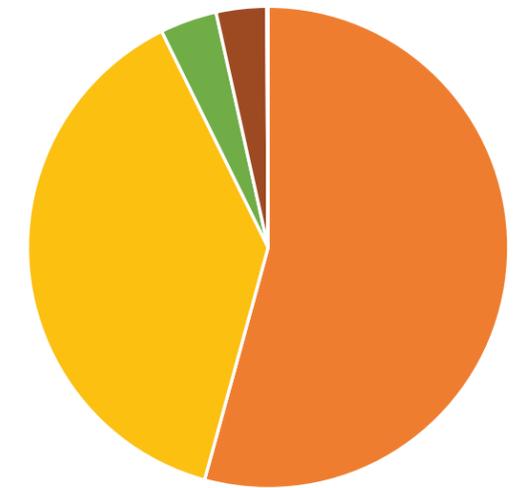


Figure 5. Website acquisition channels

- organic
- direct
- social
- referral
- e-mail



Strategic communication and leadership development

In 2019, we continued to work with strategic communications consultant Bob Lasz, founder and CEO of Science+Story. He facilitated the development of our phase two (CBO 2.0) strategic plan and branding, which resulted in securing additional Strategic Initiative Funds to support our operations through FY23, as mentioned in the funding section. In addition, we worked with Lasz to develop a series of thought leadership publications to be pitched to national and international media outlets in 2020.

➔ **FACULTY LEADERSHIP**

Associate Center Director **Beth Polidoro** was awarded a Fulbright Core Research Award to study the impacts of marine pollution on species, ecosystems and human health in Dumageuete, Philippines, from January -June 2019. During this time, she collaborated with colleagues at Silliman University and Negros Oriental State University to study the impacts of microplastics and associated contaminants in seafood. One paper has already been published and Polidoro is continuing to work with students and colleagues from the Philippines on further associated projects and analyses.
Learn more: bit.ly/37h40D4 and bit.ly/2UFFh8J

Associate Center Director of Conservation Evidence and Assistant Research Professor **Samantha Cheng** transitioned out of her ASU roles and is currently working as a biodiversity scientist with the Center for Biodiversity and Conservation, American Museum of Natural History.

Clinical Professor of the School of Sustainability **Candice Carr Kelman** joined us as the associate center director of conservation solutions, spearheading the Conservation Solutions Lab in partnership with Chemonics International.

➔ **PROFESSORS OF PRACTICE**

The **ASU-Conservation International professors of practice** completed their two-year service agreement, after teaching the Biodiversity Conservation in Practice class for two semesters, advancing research with faculty members, delivering multiple talks and workshops, and facilitating mentoring and hands-on internships for students.

➔ **STAFF**

Linda David transitioned out of her role as an administrative assistant with our center and joined the team at the Center for Accelerating Operational Efficiency as an administrative specialist.

We welcomed **Susanne Hinrichs** as the new administrative assistant in February 2019. Susanne has a background in ecology and evolutionary biology.

➔ **POSTDOCTORAL RESEARCH ASSOCIATES**

Aireona Raschke transitioned out of her role as a research analyst with the Conservation Solutions Lab and is currently working as a program director with the Central Arizona Conservation Alliance, Desert Botanical Garden.

Gwen Iacona was hired to assist in developing U.S. Endangered Species Act compliance and decision-making tools for the Electric Power Research Institute and Bayer.

Danica Schaffer-Smith joined the team as our second The Nature Conservancy NatureNet Science Fellow for a two-year term starting in August 2018.

Kelly Gravuer completed her two-year research on soil microorganisms' adaptation to climate change, as part of her TNC NatureNet Science Fellowship.

Elena Finkbeiner, who was hired in partnership with Conservation International and The Nippon Foundation Nereus Project at the University of British Columbia, completed her appointment at ASU and transitioned into a staff position with CI.

Lars Iversen joined as an affiliated postdoctoral research associate with the School of Life Sciences. He shared his insights in adjusting to an international career move via CBO's blog. Learn more at bit.ly/39m9ihp

➔ **STUDENT WORKERS**

PhD student **Erin Murphy** worked as a graduate research assistant, supporting project management, research and grant writing for the center.

Graduate student **Arielle Amrein** was hired as our administrative and communications aide during the academic year, providing key administrative, communications and marketing support to the center.

Graduate student **Infynity Hill** also supported the center over summer 2019 fulfilling the role of administrative and communications aide.



Looking ahead

As we embark on our sixth year, we seek to advance our research and education agenda around achieving biodiversity outcomes. More than ever, it is vital to create an understanding of and support for a richly biodiverse planet among individuals, corporations and nations.

There are many challenges to creating such understanding and support, including the lack of awareness of and capacity to implement win-win solutions that benefit biodiversity and the corporate bottom line, or biodiversity and satisfying lifestyle. With five years of experience behind us, we feel excited to take them on.

In future years, we will focus our activities around three major outcomes for biodiversity: (1) to decrease the number of threats to species, (2) to increase consideration of biodiversity in the private sector and (3) to develop science-based tools to facilitate decision-making that protects Earth's diverse life forms. Figure 6 illustrates how our approaches can lead to these outcomes.

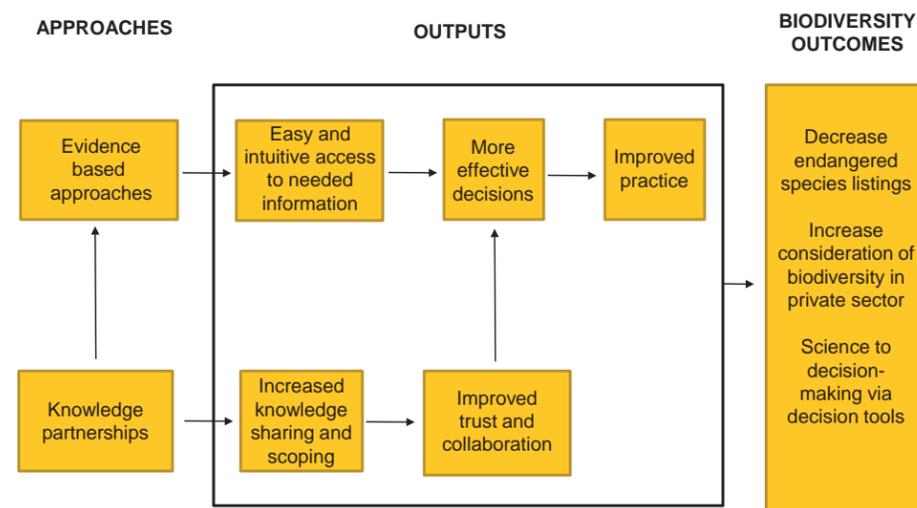


Figure 6. Our theory of change for achieving biodiversity outcomes

New partnerships with corporate and corporate-facing institutions are examples of how we aim to forge ahead into this next year. We are particularly excited to launch a suite of initiatives around increasing the valuation of biodiversity in the private sector, including new partnerships, research endeavors and leadership.

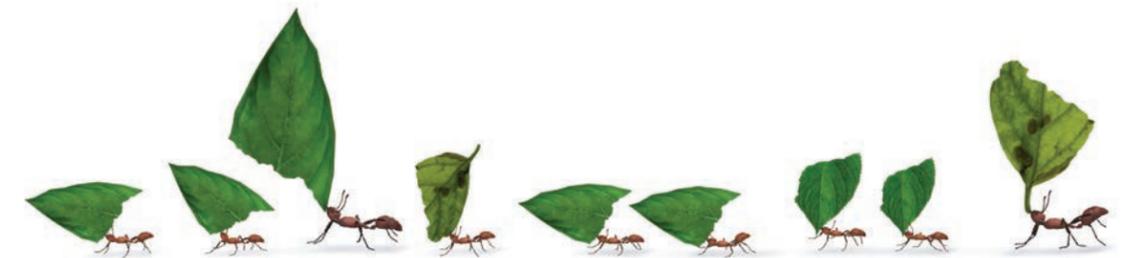


2020 goals

Big goal	Metrics
Fundraising Develop a robust external fundraising strategy	<ul style="list-style-type: none"> Establish an advisory council to guide our fundraising strategy. Apply for > \$20 million in external funds; secure \$3 million (15% success rate); secure \$350K for operations (find out if KE can redirect a portion of the F&A for operations). Convene for research incubator meeting based on at least four common themes to engage faculty on joint proposals.
Education and diversity Train the next generation of conservation leaders and increase biodiversity and inclusion in conservation efforts	<ul style="list-style-type: none"> Support research and career development for underrepresented minorities: (1) Pilot girls in STEM camp with the ASU Center for Gender Equity in Science and Technology; (2) Develop recommendations for incentivizing co-production in academia; (3) Facilitate professional development for scientists and STEM educators in traditionally underrepresented groups. Expand the reach of graduate training in communication and leadership via the Graduate Certificate in Environmental Communication and Leadership. Engage >10 students in applied research. Scope a new master's program for leaders of biodiversity conservation organization to inculcate interdisciplinary approaches throughout the biodiversity conservation sector. Spearhead a metric for societal impact for systems such as U.S. News and World Report.
Research Bring biodiversity to the center of the world's decision-making and investments and transform it	<ul style="list-style-type: none"> Assess feasibility of a Biodiversity Engagement Index. Do three or four case studies on the cost effectiveness of conservation investment. Engage more than five external partners in research co-production. Develop and refine more than three decision tools. Publish at least 15 publications. Initiate discussion with advisory council about annual conference for global leaders to establish a community of practice in integrating biodiversity into global decision-making.

Big goal	Metrics
Marketing and communications Enhance communications and media presence to achieve strategic goals	<ul style="list-style-type: none"> Increase quantity and quality of social media posts and interactions. Launch e-newsletter. Edit website quarterly. Thought leadership: (1) Publish one article in a recognized publication; (2) Explore the creation of visual pieces (infographics, videos). Finalize and synergize media/editorial and events calendars.
Operations Streamline daily functions to support the center's growth	<ul style="list-style-type: none"> Finish employee manuals (finance, events and project manager). Review relevant policies. Complete mandatory training. Help align individuals' career goals with center goals Onboard new members. Streamline tasks tracking and reporting. Host bi-weekly team meetings.

Table 2. FY20 goals and metrics



contact us

Center for Biodiversity Outcomes
Arizona State University
PO Box 875402
Tempe, Arizona 85287-5402
United States

480-727-9873 main
480-965-8087 fax

biodiversity@asu.edu
biodiversity.asu.edu



Consider donating at biodiversity@asu.edu/contribute

Copyright © 2019



thank you

for your support and dedication
in protecting Earth's biodiversity

**The Center for Biodiversity Outcomes is a partnership between the
Julie Ann Wrigley Global Institute of Sustainability and the School of Life Sciences.**