Considering Conservation
From the Editor

As someone who has a sincere appreciation for Mother Nature and her creatures, I am disheartened by what’s being called the Sixth Extinction*. Unlike prior extinction events, we’re in the midst of the so-called Anthropocene or the age of the humans – where humans figure strongly as the main cause for our planet’s losses.

From the rapid decline of thousands of species and the destruction of plant and animal habitats around the world, to climate change and the exploitation of resources needed for our very survival, we humans seem incapable of accepting our role in causing harm to our planet and unwilling to change our behavior.

Now, more than ever, critical conservation issues must not be viewed through a singular lens. Rather, they must be approached jointly through the dedicated and concerted efforts of researchers, policy makers, global treaties, economic changes, educational opportunities, sustainability practices and more.

At ASU’s School of Life Sciences, innovative efforts to address these issues at the intersection of science and society are well underway.

Professor Leah Gerber and her new Center for Biodiversity Outcomes are facilitating creative conservation solutions and forging new research efforts. Professor Andrew Smith is working in China with the pika, and professor Juliet Stromberg has launched a new plant biology and conservation master’s degree.

Recent doctoral graduate Jesse Senko is searching for ways to save loggerhead turtles, while postdoctoral researcher Jan Schipper uses camera traps to study jaguars throughout a Costa Rican conservation corridor. And, professors Ben Minteer and Stephen Pyne ask a tough question: What happens after preservation?

From tracking golden eagles to helping NASA investigate ecological problems, our alumni are also active in conservation. Learn about the work of Justin Congdon, Evan Carson, Todd Katzner and Libby Larson.

The complexity and difficulty of working in global conservation research cannot be understated; neither can the dedication, passion and determination routinely demonstrated by our researchers and students as they search for solutions to these critical issues.

Sandra Leander

*The Sixth Extinction is a relatively new idea in the scientific community. To learn more, we recommend “The Sixth Extinction: An Unnatural History” by Elizabeth Kolbert.
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Director’s Note

In light of global climate change, we frequently hear about the need for conservation — conservation of water and energy resources, animal species, habitats and ecosystems.

In past decades, conservation was often viewed as an effort to keep certain areas of the world more or less untouched by humans. But now, as we grapple with the potential calamities caused by a warming planet, conservation may be seen as more of an urgent plea.

Food scarcity, the extinction of plant and animal species, disappearing habitats and the destruction of the very resources we need to survive, are just a few critical issues our world is facing. To find potential solutions, we need creative and collaborative research grounded in an interdisciplinary approach. Our innovative professors, research scientists and students are doing just that.

Our newly created Center for Biodiversity Outcomes is focused on research, education and policy strategies to address critical biodiversity challenges. Through our partnership with the Phoenix Zoo, we are educating future biologists as well as studying habitat solutions in Costa Rica for one of the world’s greatest, yet threatened mammals — the jaguar. In addition, our undergraduates are getting hands-on experience conducting research for the Zoo’s conservation center.

Our doctoral candidates are working diligently on issues such as saving loggerhead turtles, and our faculty are being recognized for their conservation successes abroad. And, we’ve started a much-needed master’s program in plant biology and conservation in partnership with the Desert Botanical Garden.

While our school is diverse — with research and education in microbiology, molecular biosciences and biotechnology, as well as biological sciences — it is my pleasure to share with you this conservation-themed issue, which highlights just a few of our current activities. We are working diligently to create new knowledge that could lead to solutions for several critical conservation issues.

With Sun Devil pride,
Bertram Jacobs

Our mission
To inspire and transform life science students by providing an innovative learning experience that prepares them to thrive in a dynamic and demanding world.

We aim to improve life by stimulating scientific discovery and solving critical problems at the intersection of the life sciences and society.

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Cultivating a Conservation Mindset
Next generation of biologists tackling real-life conservation issues

BY MELINDA WEAVER

When Spenser Babb-Biernacki began her undergraduate degree at Arizona State University, she thought she wanted to get lost in a world of books. She started as an English literature major, pursuing her love of the written word, hoping it would lead her through college and into a career she would enjoy.

But something was nagging at her. Her path didn't feel quite right. She felt a little lost.

Then, she began to realize what was missing from her daily life: her love of animals and conservation. She decided to switch majors and study conservation biology with the School of Life Sciences and has never regretted that decision.

“I always felt I was meant to be outdoors in an active field like this,” Babb-Biernacki said. “My mom has a deep love and respect of animals and nature and instilled that in me growing up. I have a real passion for making a difference.”
Babb-Biernacki’s mom had a membership to the Phoenix Zoo when her daughter was young, and Babb-Biernacki has many memories of exciting weekends at the zoo. When the opportunity arose for an internship through a partnership between ASU School of Life Sciences and the Phoenix Zoo, she couldn’t wait to apply.

During the end of her junior year, she was awarded a three-month summer internship that provided her with the unique experience of working with several under-studied animals through the Zoo’s conservation program.

Again, a childhood memory surfaced, reminding Babb-Biernacki that she was heading down a path she had always known she wanted.

“A few years ago, we were at Disney World and they actually have a conservation station in their animal kingdom and I was just amazed by it,” Babb-Biernacki said. “I was looking in all the labs, I was listening to people doing their educational spiels and I just loved it. I was thinking this is something I would love to do.”

She got to spend the summer doing just that. The Phoenix Zoo operates its internships in loops, such that student interns get to try their hand at all aspects of conservation science: animal husbandry, lab experiments and field work. Through this program, Babb-Biernacki found herself working with all of the nine local species on which the Zoo focuses its conservation efforts — everything from the tiny, 3 millimeter Springsnail to mammals including the Mount Graham squirrel. She started her internship working in the black-footed ferret exhibit before moving to the outdoor exhibits and conservation center. She was also encouraged to work on her own experiment with a species rarely studied: the narrow-headed gartersnake.

“Conservation has different focuses. Sometimes you don’t realize what your interests are until someone gives you a job and you realize ok, I don’t want to do that,” said Stuart Wells, Director of Conservation and Science at the Phoenix Zoo. “This offers an opportunity because of what we do – we do field work, we do interpretive, we do experimental design and we do husbandry. So, it gives students a chance to try those out — win, lose or draw — to get an idea where their interests are.”

The Phoenix Zoo – Arizona Center for Nature Conservation has been officially open since 2007; however, it began focusing on endangered or threatened species more than a decade before that with the hopes of reintroducing them to the wild. The Phoenix Zoo was one of the three facilities approached in the early 1990s to help breed black-footed ferrets, which were believed to be extinct in the wild in the 1980s. On the heels of that successful effort, which has resulted in more than 100 ferrets being released back into the wild, the Zoo began working with other declining local species.

Wells said that observing local species in a captive setting can be very informative because researchers can learn things about the animals that are difficult to ascertain in the wild, such as how fast they grow, when they reach reproductive age and when they reproduce. For example, until recently, no one knew that the Mount Graham squirrel was only receptive to breeding a mere four hours out of each
Because of the Zoo’s research on captive squirrels, researchers now know when that is and can include that critical information in any conservation plan for areas in which the squirrel is found.

Babb-Biernacki discovered firsthand how valuable zoo research could be through her own project on the narrow-headed gartersnake. Because of the Zoo’s research, students have learned that a species thought to be primarily aquatic because it eats fish actually spends very little of its time in the water. In fact, it really only enters the water to hunt. And, she is hoping to learn even more about this elusive study organism. Her project involves measuring growth rates in neonates and studying differences in behavior in neonates and adults of reproductive age—research that has never been done before on this species.

“Not a lot of research has been done on them because it’s not easy to follow a snake around and see where it goes and what it does,” Babb-Biernacki said. “They’re very cryptic. You don’t want to follow a snake for a year. Now, they’re outside of the wild and you can actually monitor their behavior and track how fast they grow.

“We’re doing things that have never been done before. It’s really nerve-wracking, but also very exciting.”

This internship has provided Babb-Biernacki with an exciting and valuable research experience—all made possible through this conservation-focused partnership.

“At ASU, we strive to provide undergraduates with unique opportunities to gain hands-on research experience with scientists who are at the forefront of their fields,” said Kevin McGraw, director of the School of Life Sciences Undergraduate Research (SOLUR) Program. “Our partnership with the Phoenix Zoo is special because they specifically seek out our students and teach them a variety of skills in conservation research that they wouldn’t gain anywhere else.”

The Phoenix Zoo specifically began targeting ASU undergraduates in 2009 and now it provides nine internships each year, three of them paid. Wells designed an internship program with four goals in mind: to develop understanding of animal husbandry which can help create programs for release, to understand basic research concepts, to understand interaction between research and education, and to get students involved with work being done at the Zoo’s conservation center.

In addition, the center works with organizations such as Arizona Game and Fish and U.S. Fish and Wildlife Service, where students studying conservation may want to apply for jobs after graduation. In addition to learning new skills, student interns can make valuable connections that may further their post-ASU career.

“When I earned my undergrad, I was thinking I wanted to go into biology, but I didn’t have a good sense of what that application was,” Wells said. “I think these kinds of programs, especially with these focal points, give an insight to people going into school as to what their interests are.”

After graduation, Babb-Biernacki plans to continue pursuing a career in conservation science and would like to work in a conservation center similar to the one where she spent her summer, as long as, like the Phoenix Zoo, there is a fieldwork component.

“I’ve wanted to work in a conservation center because of the variety of things you get to do. You get to do field work and then you get to come back and do things in a more lab-like environment,” Babb-Biernacki said. “But I love fieldwork. I’ve learned that through the course of my education. I love going out and getting my hands dirty in the field.”

As an undergraduate, Babb-Biernacki fell in love with conservation through courses offered at the School of Life Sciences. She remembers learning about the black-footed ferret reintroduction program during a lecture. She wrote a paper about the conservation of the Mount Graham squirrel for one of her classes. And then coincidentally, she got to study those animals herself. “Doing internships validates everything that you learn,” Babb-Biernacki said. “I actually get to go and see how the things I’ve been learning about are applied and see what researchers are doing. They really speak to one another: education and experience. It’s so much more than hearing about something in a classroom; it’s actually becoming a part of what you’ve been learning.”

Conservation efforts by the Phoenix Zoo helped the Arabian oryx, a native of the Arabian Peninsula, come back from the brink of extinction. © Sandra Leander
A Partnership in Plant Biology and Conservation

New master’s degree grows pool of plant experts

BY DEVIN PHILLIPS
Quick — without thinking about it, name an endangered animal. Name two, three or even four. Easy?

Now, name an endangered plant. Two? Three? For many people, that's not as easy.

These basal organisms on the tree of life provide us with practically everything we need to survive in some way or another. However, in the field of biology, the importance of a particular topic doesn't necessarily mean the general public will pay much attention.

Plants and their conservation lack a certain "sex appeal" in the mainstream. Over the past several decades, this has been reflected at many universities as botany degrees have declined and interest has shifted to the study of plants at a molecular level.

But the demand for botanists and experts in endangered plant species has not waned. Indeed, there is an even greater need as the world faces global warming.

"Plants are an incredibly important part of the ecosystem," shared Julie Stromberg, professor with Arizona State University's School of Life Sciences. "Unfortunately, people don't really think about the fact that plants contribute oxygen, the food we eat, the materials and fibers we use, as well as medicines. As a society, we need to look at plants as the key elements that sustain us, spiritually as well as in more tangible ways."

To address the shortage of plant experts, the school recently launched a new master's degree program in plant biology and conservation. The program is part of a national trend, where a leading botanical garden partners with a university's biology department to offer unique teaching and hands-on research experiences.

ASU is on the cutting edge of that trend, joining forces with the Desert Botanical Garden to offer the new degree. Now, plant conservation may find some revitalized support.

"This seems like a real 'win-win,'" said Kim McCue, co-director of the degree program and Program Director of Conservation of Threatened Species and Habitats at Desert Botanical Garden. "By having a university collaborate with a botanical garden, we have greater ability to train people in the botanical sciences, and we know firsthand that these people are worth training. We live in a unique ecosystem in the Southwest—the Sonoran Desert. It makes sense to offer a master's degree in plant science in a place that has such value," she added.

Botanical garden researchers can share their knowledge through guest lectures, lab experiences and graduate committees. These resources are unique and would be difficult to obtain anywhere else. The students can gain practical experience while getting their feet wet in real-world research projects.
Tyna Yost, a recent graduate of the program, has already secured a position with the U.S. Forest Service, focusing on aspects of the National Environmental Policy Act.

“I started taking classes for the nursing program and quickly discovered that plants are much better patients. I like to say that they’re smarter than us,” said Yost. “They can make their own food, depending only on light and carbon dioxide. Their chemical defenses and rate of adapting to different environments is just amazing. So I call them the higher species.”

Stromberg, ASU’s director of the program, stresses the importance of offering a master’s degree in the field of plant biology and conservation. While doctorate degrees are important, she said master’s programs like these are excellent options to gain experience and move into the workforce more quickly. Many jobs in the plant world are fit for graduates of master’s programs, such as those offered by state and federal agencies.

“There are several strengths to our master’s program,” shared Stromberg. “First is our focus on endangered plant species. If you look at the IUCN Red List of threatened species, you will find that most plant species have yet to be assessed. Many are declining, but few are being tracked.

“Second, we focus on restoring plants and habitats, in particular, endangered ecosystems. The Desert Botanical Garden can participate by providing seeds, propagated plants and botanical expertise.

“Third, our program is strong in systematics and understanding phylogenetic relationships, as well as in ecophysiological studies — examining the roles plants play in their ecosystems and the mechanisms that adapt them to their environments. We also focus on ethnobotanical studies — understanding how people and plants are co-evolving through time,” added Stromberg.

Degrees like this are good news in the world of plant conservation. They provide companies and organizations with more knowledgeable people who care about securing the future of plants.

Also, Stromberg and Yost agree that too much conservation attention is focused on issues such as invasive species. They state that endangered species, as well as dominant plants that do most of the ‘work’ in ecosystems, should have more of the botanical limelight.

“It’s easy to point the finger at certain plant species and say they are the cause of adverse changes, when instead, they might simply be a reflection of broader environmental changes such as climate shifts or increasing urbanization,” Stromberg said. “It’s time to move beyond eradicating so-called ‘bad’ plants and preserving ‘good’ ones. We need to recognize the value of all plant species and embrace the complexity of the ecological relationship between plants and people.”

Yost specializes in endangered plant species. She hopes that with the knowledge she gained from the new master’s degree, she can help maintain the life forms that selflessly provide for us, as well as help cultivate greater attention to the fact that we must work harder to conserve these valuable resources.

“I think it goes back to that awareness and where our priorities are,” shared Yost. “Even with all our technology, when it comes down to it, as a species we need certain things to survive. Food, water, medicine. Plants are a part of all that. We have to keep that in mind.”

McCue agrees. “We can do all the great science in the world, but if the greater public doesn’t know why it’s important or how amazing these plants are, they won’t care. And if they don’t care, you’re not going to get anywhere,” she added. “Our partnership with ASU is a major component of that and I’m just thrilled by it.”
Yost (L) and McCue (R) work in the Desert Botanical Garden herbarium.

Desert Botanical Garden is one of 36 botanic institutions in the U.S. that work with the Center for Plant Conservation to conserve native, rare plant species. Its greenhouse hosts 52 species of rare, threatened and endangered plants.

© Sandra Leander
Saving the Loggerheads

The complexities of sea turtle conservation

BY BIANCA ZIETAL

The ocean and its creatures have long fascinated humans, and who can better attest to this than Jesse Senko, a recent graduate of Arizona State University’s biology PhD program. Senko’s interest in marine life emerged when he sailed out into the Pacific Ocean off the coast of Mexico’s Baja California Peninsula for the first time as an undergraduate, studying sea turtles in their natural environment.

Sea turtles have been around for nearly 200 million years — back when the seven continents were a single landmass known as Pangaea. Today, they can be found in every ocean but the Arctic and can live as long as 80-100 years.

During her lifetime, a female sea turtle will journey thousands of miles back to the same beach where she was born to lay her eggs. She will lay as many as 700 eggs per season. North Pacific loggerhead sea turtles (Caretta caretta) have been nesting along coastal areas of Japan for countless generations. Upon hatching, baby loggerheads immediately waddle across the sand and into the water, making an incredible 7,500-mile beeline toward the Pacific coast of the Baja Peninsula.

It’s a dangerous journey — one that most don’t survive.

“I was tracking a young juvenile green turtle for my master’s work at the University of Florida,” shared Senko. “The research was part of an Earthwatch expedition. We named the turtle ‘Bujia’ which is Spanish for ‘spark-plug.’

“With practically no sleep, we tracked this turtle for several days and nights until finally, we tracked it to its death — it had drowned, trapped in a fishing net and unable to surface to breathe. This was what inspired me to do the work I did for my PhD here at the School of Life Sciences, and more generally, my interest in developing applied conservation solutions.”
Fishing gear easily entangles sea turtles

Today, many species of sea turtle are endangered. Every year, they are trapped in fishing nets as “bycatch” — the unintentional killing of non-target animals. Vulnerable and endangered species including whales, dolphins, seabirds and manta rays are also frequently fatally ensnared.

Gillnets, a specific type of crosshatched nylon or monofilament netting, are commonly employed throughout the world by large and small-scale fisheries alike. The nets are typically spread out over more than one half-mile and left to soak for one to two days. As a variety of marine life attempt to swim through the net, they are entangled and unable to escape.

One area commonly fished by small-scale fishermen along the Baja peninsula also happens to be a feeding hot spot for endangered loggerhead turtles. Fishermen are targeting halibut and grouper, which eat pelagic red crabs, just like the sea turtles do. The turtles and the target fish are often found in the same areas.

Unsurprisingly, many loggerheads are accidentally captured in gillnets. Senko has observed firsthand this unfortunate situation, driving home the importance of his research to find ways to make the deadly gillnets safer for endangered marine life.

Forging collaborations for research

To carry out a research project for his PhD, Senko set out to the Baja Peninsula and came to know many local fishermen who invited him to fish alongside them. Many are third- and fourth-generation fishermen. Fishing is their only source of income and they struggle to afford even basic gear.

Senko first began modifying gillnets by removing their floatation buoys. He then compared their effectiveness against the unmodified nets used by the fishermen. While conducting the experiment, seeing the number of dead turtles was especially disheartening.

“It never gets easier,” Senko shared with a sigh, recalling a time one fisherman pulled up sixteen drowned sea turtles from one catch. And this was just one fisherman, on one day, with one net.

“These fishermen don’t want to be catching sea turtles, they know it’s illegal and that they’re endangered,” Senko insists. “But this is the way they put food on their own tables.” Getting to know them on a personal level allowed Senko to learn about the challenges they face, as well as witness the tragic relationship between the fishermen and the turtles — both just trying to survive.

Loggerheads are returned to the ocean after being removed from a fishing net. © Jesse Senko

Senko and his Mexican colleagues hold LED lights aboard a local fishing vessel. © Jesse Senko

Senko and a fishing colleague hold loggerhead turtles before releasing them back into the ocean. © Jesse Senko
Bycatch — the unintended capture of non-target animals

In most cases, the lifeless turtles and other bycatch are thrown back to the sea after being cut from the nets.

According to current Mexican law, taking, killing or selling sea turtles or products made from them is punishable by up to 12 years in prison. However, there is little government oversight or enforcement in the field.

In the U.S., if a fishery has more bycatch than is legally allowed under the National Oceanic and Atmospheric Administration policies, it can be immediately shut down. For example, the Hawaii Longline Fishery closes once all vessels in its fleet have captured only 34 loggerhead turtles during the course of one entire season.

According to Senko’s research, the small-scale net fisheries working in the Baja loggerhead turtle hotspot may be unintentionally catching as many as 100 to 400 sea turtles every day during peak fishing season across the fleet, which are the highest known sea turtle bycatch rates in the world. While the fishermen are quick to be blamed for harming the turtles, he emphasized that they are working in a system that does not incentivize sustainable practices.

“In fact,” said Senko, “the system disincentivizes fishing sustainably because if you don’t take as much as you can, your neighbor will. There is very little regulation and virtually no enforcement; it’s basically a free-for-all.”

Searching for solutions

Earlier this year, Senko and his colleagues published their research findings and detailed the effect of removing buoys from gillnets. The researchers found that buoyless nets reduced average sea turtle bycatch rates by an astounding 68 percent, while retaining much of the “target fish” catch. And, the modified nets cost less because buoys make up about 20 percent of total net costs. However, fishermen made less money with the buoyless nets, so Senko and his colleagues looked for a better solution.

They tried a second innovative net modification — installing LED lights along the nets. This illuminated the net so sea turtles could see it and avoid swimming into it. Senko found that the lights reduced turtle bycatch by 50 percent, but only at night. Since the fishermen still had to soak their nets during daylight to turn a profit, the lighted nets were also not an optimal solution.

Interestingly, however, the illuminated nets significantly reduced total bycatch during both daytime and nighttime, which included not only sea turtles but also squid, non-target fish, manta rays, sharks, crabs and even target fish species that were too small to harvest.

Senko believes an even better solution would be to use modified fish traps instead of gillnets, which would completely eliminate bycatch of sea turtles and other non-target species.

“Fish caught in traps are also alive, and so you have a higher quality product, and we know there is high demand,” says Senko. “It’s a total win-win, but getting fisherman to convert gear is difficult.” Senko explained. “Also, having a foreigner tell you how to do the job you and your family have been doing all your life is not simple.”

Professor Andrew Smith, a conservation biologist with the School of Life Sciences who served as Senko’s PhD advisor, said the complexities of conservation work can be daunting.

“Conservation is not theoretical. It happens on real landscapes affecting both the trajectories of species populations as well as the livelihoods of local people,” said Smith. “Jesse’s strength is his understanding of this dynamic, and how best to work with both turtles and fishermen to maximize positive outcomes for both. These situations are incredibly difficult, but more than ever we need conservationists like Jesse who can roll up their sleeves to tackle these complicated situations.”

Ideally, Senko would like for fishermen to bypass the middlemen and sell their products directly. Such a process would provide a greater profit that in turn, would incentivize more sustainable fishing practices.

Senko is beginning a postdoctoral position at ASU with the School for the Future of Innovation in Society, where he will continue his research on sustainable fisheries and sea turtle conservation.
Inventorying the Ark
A pragmatic approach to extinction

ASU Center for Biodiversity Outcomes creating solutions to conserve

BY SCOTT SEKEL

Biological diversity is the variety of life on Earth, ranging from the microverse of crabs, barnacles and mussels nestled in a tidal pool to a macroverse of baboons, giraffes and elephants ranging across savanna and veldt.

And it’s disappearing. Too often we read about another species in danger of extinction. Ninety-eight percent of tigers are gone. There are four northern white rhinos left in the world — three at a conservancy in Kenya and one in the San Diego Zoo. Thirty percent of frogs are nearing extinction. Honeybees are vanishing across the globe.

There’s no longer a question of how we’re going to save all these species. The reality is we’re past that point.

“We can’t save everything,” said Anita Hagy Ferguson, program coordinator for ASU’s Center for Biodiversity Outcomes. “We’re not operating in that la-la land. It’s heartbreaking, but we are operating with real data, with real reality, and you cannot save everything. You have to make choices in what to save and how to save it, so that we can move quickly.”

The center, housed in both the School of Life Sciences and the Global Institute of Sustainability, was created a year ago to pragmatically stem the tide of loss in what has been called the Sixth Extinction. Its mission is to make discoveries and create solutions to conserve, where possible, and to manage biodiversity for the long term as the world rapidly changes.
“If we don’t have anyone who can understand nature, how can we protect it?” said founding director Leah Gerber, a marine conservation biologist and professor with the School of Life Sciences.

The center’s research focuses on five areas: biodiversity assessment and decision tools; governance and biodiversity; advancing corporate sustainability; public health and biodiversity; and engagement of underserved youth.

Educating two groups with little knowledge of nature — decision makers in business and government, and underserved youth — is the key behind those five research areas, Gerber said.

How will the center know it’s making a difference? When corporations automatically think about their impact on the natural world, when government agencies and conservation groups ask for help in solving problems, and when young people who traditionally aren’t involved with the natural world choose careers in conservation biology.

“As far as success, our metrics are impacts on decisions, on society and on building our capacity to address biodiversity challenges,” Gerber said.

New methods

Conservation scientists know they’re losing the fight. Traditional methods, like roping off a habitat and telling people “hands-off,” aren’t working.

“A big reason is because biodiversity conservation problems aren’t really problems inherent with the animals and plants,” Hagy Ferguson said. “They’re human-social problems.

“We want to work with the local people who live in those places where those species live. We want to work with people who fish for a certain kind of fish that’s going extinct. Even though it’s a resource, they have an interest in its conservation from a resource perspective. Our objective is to work on multiple scales.”

Going out and studying something and tossing results back to interested parties hasn’t worked for conservation biologists either.

Instead of coming down from the mount of academia and bestowing knowledge, the center’s approach is to go to the outside world and ask questions. What kinds of problems do you have, and how can we help? What is your need? Researchers offer questions in a scientific framework, applying rigorous methodology. They then go back and say, “Here is how we’re going to answer this question. What do you think? How can you work with us?”

“Even when people make an effort to communicate science to the public, it’s difficult to do it in a way that’s meaningful to them,” Hagy Ferguson said.

When Gerber meets with nonprofit organizations and other non-governmental groups, she often hears this: “I need a decision on this thing that needs to be made tomorrow and I have no data.”

Two ways the center aims to answer that type of query are with tools and people. “There’s a very practical way we’re trying to make some inroads and stem the flow of loss,” Hagy Ferguson said.

Decision-making tools

The general public cares about biodiversity. It reflects well on a corporation — it’s one reason why Dawn puts pictures of seals on bottles of soap. Coca-Cola has an intensive water-conservation campaign and plan. It looks good for them but they are also aware that if there’s no water, there’s no Coke either.

The Dow Jones Sustainability Indices are a sign it’s an important issue in the corporate world. Launched in 1999, the family of indices evaluates the performance of 2,500 companies based on an analysis of economic, environmental and social performance, assessing issues such as corporate governance, risk management, branding, climate-change mitigation, supply-chain standards and labor practices. The trend is to reject companies that do not operate in a sustainable and ethical manner. British Petroleum was booted off in 2010, 40 days after the Deepwater Horizon blew up in the Gulf of Mexico.

However, many corporations have no idea how to go about becoming sustainable.
What Gerber recognized was a demand from the corporate sector on data and analytics.

“Not that necessarily the corporations altruistically care, but a lot of shareholders want to make socially responsible choices, so there’s a demand,” she said. “But they’re not scientists. They don’t have the capacity. So we have this opportunity to provide relevant information and to provide new tools that can be used. I would define success as large corporations using tools that consider nature’s services and resources in everyday operations.”

The first tool created by the center was a water decision-making tool. This tool will help corporations assess risks to the public, the environment and their business associated with their water use. It was presented to the World Business Council for Sustainable Development in Paris last December.

The center is also creating a biodiversity offsets tool. A logging company using it might decide to cut down five trees in one area, but to plant five others in another area.

“What we’re trying to do is to get them closer to doing that equal thing,” Hagy Ferguson said. “Help people to recognize that the place you actually want to pull out trees is a super-biodiverse area.

“It might not even be a tree-for-tree thing; it might be we’re going to take these trees and contribute to the tiger fund. It’s trying to see if we can have corporations replace the impact in some way... The tool helps them make decisions, but it also protects their bottom line.”

Another focus of the center is to produce highly trained scientists who will have an immediate impact in a field that is beginning to seek them. Traditionally, graduating with a conservation biology degree meant either academia or a competitive job market with few openings.

Non-profits such as the Nature Conservancy, the National Wildlife Federation, and Conservation International all have programs targeted at youth.

“What we’re going to do is grab those youth and pull them through college, and then they’re going to pull them back from us when they’ve gone through our program and give them jobs,” Hagy Ferguson said.

The International Union for Conservation of Nature (IUCN) is the largest professional global conservation network, with almost 11,000 scientists volunteering. Most people know it from its Red List, which usually appears in the news as a headline that something is on the verge of extinction. More specifically the Red List tells the world what’s looking good and what’s not for a particular species. The IUCN is doing a worldwide inventory of everything.

“We can’t make decisions about what to save if we don’t know what we have,” Hagy Ferguson said. “Doing the assessing and Red Listing is a very particular methodology, and you have to be specially trained for it. They are the global standard because their data is good data, and their data is good data because they follow a very rigorous standard. It’s reliable.”

The center, which has several faculty affiliates who work with IUCN, is providing IUCN training.

“What we want to do is position ASU as an IUCN training center,” she said. “We’ll train people for Red Listing, which gets students out in the field and learning a practical methodology.”

The center has big goals and small, specific ways of moving towards them.

“I am confident we’re going to get there in the next couple of years,” Gerber said.
ASU biologist floats idea of whale-hunting compromise

BY SCOTT SEKEL

Two Minke whales are dragged aboard the Nisshin Maru, a Japanese whaling vessel that is the world's only factory whaling ship, © Australian Customs and Border Protection Service
Is it time to cut a deal with Japan on whaling?

The three-decade international moratorium on commercial whaling isn't working. Animal-rights activists insist the ban remain absolute, while the three rogue nations still pursuing the world's largest mammals refuse to quit hunting.

Leah Gerber, a marine conservation biologist, professor at Arizona State University’s School of Life Sciences and founding director of ASU’s Center for Biodiversity Outcomes, floated the idea of a compromise in the September 2015 issue of the journal Frontiers in Ecology and the Environment.

Rebounding whale populations, the predominance of other threats, and stubborn stakeholders make the moratorium a “failed management system,” Gerber said. The past 30 years of the International Whaling Commission’s conversation has been stalled by disagreement on the ethics of killing whales.

“It really boils down to an ethical argument: that it’s not right to kill a whale,” Gerber said. “Personally I don’t like the idea of killing a whale, but that’s my value, and other people have other values. Insisting on our values in discussions about whaling has resulted in a global stalemate.”

Changing course and allowing Iceland, Japan and Norway to legally hunt under regulations and monitoring might break the current stalemate. Currently Japan whales under a loophole allowing for scientific research. The other two countries hunt whales commercially in protest of the ban.

“If our common goal is a healthy and sustainable population of whales, let’s find a way to develop strategies that achieve that,” Gerber said. “That may involve agreeing to a small level of take. That would certainly be a reduced take to what’s happening now.”

Since the moratorium was declared in 1982 and begun in 1985, whale populations have rebounded across the board, Gerber said.

“Overall the whaling that’s happening is not threatening any population,” she said.

“With the exception of the J stock (a population that lives in the East China Sea, the Sea of Japan and the Yellow Sea) of minke whales, current levels of take are fairly sustainable.”

The appetite for whale meat has been on the decline in Japan. An April 2014 poll by Asahi Shimbun, Japan’s newspaper of record, revealed that 14 percent of respondents occasionally or rarely ate whale meat. Thirty-seven percent said they never ate it. Consumption in Japan peaked in the 1960s and has steadily decreased; today, whale-meat consumption is about 1 percent of its peak, according to the International Fund for Animal Welfare.

The Japanese have argued that it’s part of their cultural heritage. They also call American protests hypocritical because Alaskan Inuit tribe members hunt whales every year.

Norwegians have eaten whale meat since medieval times, but that habit has slowed in more recent times. Whale was served in school cafeterias and as military rations during the 1970s and 1980s, making it the mystery meat for a generation that won’t touch it anymore. It’s seen as something your grandparents ate. Oddly, it’s enjoying a renaissance among young Norwegian foodies.

The 2015 catch netted about 700 tons of whale meat, while the Norwegian market won’t bear much more than 500 tons.

“Good catch is all very well, but we have challenges in the market,” Age Eriksen, CEO of a seafood supply company, told Norwegian public broadcaster NRK last year. “We’ve got more meat on land than we can sell, and it is not a desirable situation.”

Minke whales in the Southern Hemisphere have such a large population that taking a few wouldn’t be a big deal, Gerber said.

The media perception of whaling is often that it’s evil, but there are worse threats to the whales’ livelihoods, Gerber said. For instance, she said that whale mortality numbers are also driven by the mammals being hit by ships. For instance, blue whales off the coast of Long Beach, California, simply didn’t know to get out of the way of ships, according to a Stanford University study released in April. Because they are the biggest creatures in the sea, they’ve never had to avoid threats.

Bycatch entanglement, where whales are snagged in nets, and contaminants in seawater are two other serious threats.

“For most populations, whaling actually makes up a pretty small fraction of whale deaths,” she said, pointing out that International Whaling Commission members know this. “We don’t have to agree on everything, but let’s take some baby steps.”

Violent action by animal-rights groups has not had an effect, either.

“A lot of the non-governmental organizations such as Greenpeace and Sea Shepherd raise a lot of money in advocating for saving whales by chasing whaling vessels in the open ocean,” Gerber said. “What success has that had?”

Japanese whaling delegates have said they’re open to compromise arrangements, Gerber said.

“The animal-rights groups, on the other hand, are like, ‘Nope. My deal or nothing.’ To me, it’s not the best way to lead to change.” 😊
Wildlife Corridors
Building a Future for the Jaguar

BY SANDRA LEANDER
Pura vida!

In Costa Rica, the national expression ‘pura vida’ has many interpretations including ‘enjoy life,’ ‘take it easy,’ and even ‘hello’ and ‘good-bye.’ Yet the literal English translation and touristic understandings of the phrase are lacking in comparison to its use by ticos — the Spanish word Costa Ricans use to describe themselves.

Some ticos say pura vida refers to a way of living — recognizing that life is good and that whatever your current situation, it can always be worse for others.

Such is the case for one of that nation’s most formidable icons — the jaguar.

As the largest of the big cats in South America, the jaguar (Panthera onca) is a stealthy predator, nimble on land and in the water. This powerful carnivore dominates its habitat, feeding on anything from deer and tapirs, to fish and turtles. It can ambush its prey from the treetops, crushing an animal’s head with its tremendous jaws.

Male jaguars mark huge swaths of land, each claiming as much as 50 square miles as his territory. A stunning animal with tawny fur covered in black rosettes, the male can weigh up to 250 pounds. They are solitary animals, other than during mating and pregnancy seasons when the male will live with the female.

A female jaguar gives birth to two to four cubs at a time. She teaches them to hunt after they are six months old. By age two, the cubs are out living on their own. These beautiful beasts can live 12 to 15 years in the wild.

However, this incredible animal is in serious danger. The jaguar appears on the IUCN Red List as ‘Near Threatened’ and human activities, including poaching and deforestation, are the leading causes of its decline. Current research may indeed show that the species could qualify for a higher threat category.

“A jaguar needs a huge area to survive,” said Jan Schipper, a conservation research post-doctoral fellow working in partnership with Arizona State University’s School of Life Sciences and the Phoenix Zoo-Arizona Center for Nature Conservation. “There’s not enough habitat left, so we have to figure out how to use the area that’s available in a creative way.

“In addition, poaching has been a huge problem for a long time, partly because there’s not only jaguars, but also puma moving in and eating goats and sheep. A lack of sufficient natural habitat pushes these mammals closer to human populations,” he added.

Schipper’s interest in jaguar research began 12 years ago with collaborators from ProCAT, an international non-profit, non-governmental organization focused on sustainable conservation strategies; CATIE, a Costa Rican center for tropical agricultural research; and the University of Idaho. The National Autonomous University of Mexico (UNAM) joined their research efforts more recently. Schipper and other conservation biologists are studying whether it’s feasible to create a wildlife corridor in Costa Rica that would allow jaguars the room they need to thrive.
High in the top of the rain forest canopy, the ASU School of Life Sciences conservation research team searches for a suitable camera trap location. © Sandra Leander
“We're trying to understand how the mammals are distributed and what variables are important to explain how they use this space,” said José Fernando González-Maya, a member of ProCAT and the scientific director of Sierra to Sea Institute in Costa Rica, a non-governmental organization working to improve biodiversity and human well-being. “We want to understand how human influence, in terms of hunting and in terms of all the modifications they do to the habitats, how they affect animals using this space.”

**Human impact**

In Costa Rica, as in many countries, it's easy to see the negative impact *Homo sapiens* have on animals and their habitats.

In addition to the creation of towns, cities and freeways, humans use land for agriculture, cattle ranching and coffee plantations, among other things. In addition, hundreds of thousands of acres of tropical rain forests are clear-cut to make room for African oil palm plantations, which provide fruit used to create palm oil — an edible vegetable oil. Used in everything from crackers and candles to cosmetics and biofuels, palm oil has become one of the largest agricultural industries in Costa Rica.

Poachers regularly kill jaguar and puma for their pelts and for trophy hunting, as well as to keep the big cats from eating goats and sheep. © José González-Maya
The deforestation created by this industry, along with the creation of banana, pineapple and in some cases coffee plantations, has pushed jaguars out of their habitats and into increased conflict with humans. Poaching, whether for trophy hunting or to keep the big cats from killing cattle and sheep, is a serious problem.

Schipper explains: “I think the problems we have here really epitomize the problems that we have across the range of the jaguar. Shrinking area. Lack of enforcement in national parks. There’s a lot of parks in Costa Rica, but unfortunately, some of them are very remote and don’t get the same level of support that they need to actually protect the parks from poachers going in, which is an incredibly challenging problem.”

Creating Wildlife Corridors

Schipper and González-Maya are part of a larger, ongoing effort in the Latin American country to preserve what remains of the critical, tropical habitat and also protect the species that live there. Many animals living in the Costa Rican rain forest need a cohesive environment to survive and thrive, but with habitats becoming smaller and more and more fragmented, it’s critical for the researchers to find new solutions that can be implemented in the near future.

“One of the key aspects of our study is to actually design and understand how a biological corridor works, and how we can connect the higher parts of this country to the lower parts in the low lands, connecting protected areas and allowing animals to move throughout the landscape and providing them with all the ecosystem services they need to survive,” said González-Maya.

To help understand how the animals are moving within the area, the researchers use camera traps mounted in strategic locations to gather data. But to set up the cameras, the scientists needed to develop new relationships with partner organizations, specifically those with an interest in conservation.
The researchers knew of a 600-acre parcel of land located within the Amistosa corridor. The parcel, previously slated to be clear-cut, was purchased more than a decade ago by new owners who had different plans for the property. Schipper and González-Maya eventually partnered with Finca Bellavista, a sustainable tree house community situated between the two sites the researchers are trying to connect. Their hope is that jaguar and other species can use the land to move between the national parks.

“We are proposing to connect La Amistad in the Talamancan Highlands with Corcovado National Park on the Osa peninsula, two large national parks which have jaguar populations,” said Schipper. “La Amistad has a relatively large jaguar population which we’ve been studying for more than 10 years. The Osa has a very small population mostly due to hunting, poaching and loss of habitat.”

Finca Bellavista is a non-traditional residential community that features sustainable tree houses used for year-round living and tourism, as well as an infrastructure with trails, bridges and zip lines rather than roads and fences.

“This will never be a pristine piece of rainforest, but it doesn’t mean that it can’t be a thriving and healthy home for a lot of the animals that thrive in secondary growth rainforest,” said Erica Elise Andrews, co-owner of the development. “We want our property to be a centerpiece, something we can show off to the rest of the world as a working model of living sustainably within a migration corridor, and within critical habitat that also provides opportunities for research and connectivity.”

Schipper’s research team has access to the land and its resources — critical to gathering their data.

“I think we are uniquely collaborative. This is a multi-faceted problem that needs more than interdisciplinary efforts. We’re working with biodiversity, economic incentives and agriculture and we’re trying to piece it all together in this biological corridor. Finca
Bellavista is a key component in the landscape and we’re hoping the animals will move along this trajectory,” said Schipper.

Studying the Jaguar

Jaguar, puma, ocelot, tapirs, howler monkeys, sloths, reptiles and a host of other animals thrive in Costa Rica’s jungles. They are well suited for life in this dense, tropical landscape. But studying these animals is often difficult.

Schipper and González-Maya, along with other researchers, have placed hundreds of camera traps throughout several strategic corridor locations. The motion- and heat-activated cameras take hundreds of thousands of animal images, along with some disturbing images of poachers and smugglers.

Setting up the cameras in places likely to capture useful images is no small feat. First, the scientists must find suitable locations and then travel to them, often on foot and carrying large, heavy packs of gear. Research days are filled with planning, hiking, driving, climbing and camping. Multiple crews must coordinate efforts so they don’t duplicate camera coverage. Later, the teams return to each site to gather memory cards or retrieve cameras.

“I’m assisting in setting up the camera traps,” said Chelsey Tellez, a School of Life Sciences graduate and research assistant on the project. “I’ll set the date and time and input the GPS coordinates. We generally look for trails that are game trails, or trails that animals may take. We try to find a tree sturdy enough to hold the camera and then set it up to capture as many animal images as we can.”

Hiking through dense foliage makes it difficult to cover long distances. At Finca Bellavista, the crew uses existing zip lines to reach the top of the canopy.

“In addition to jaguar conservation, we are also looking at how species move across roads and other features in the corridor. We’re looking at whether cables are an effective way for animals to get from one side of the road to the other. Arboreal mammals, specifically primates, kinkajous, small carnivores and other animals that live in the canopy, have a hard time crossing the roads and surviving. Creating a cable system may be helpful in connecting habitats,” said Schipper.

Co-owner Matt Hogan said they have seen many animal species return to their land by allowing the forest to be a forest and by keeping the poachers at bay.

“It’s really exciting to see the animals, especially the nocturnal ones that are moving around all night when we are sleeping. Sometimes we hear them and sometimes we don’t. By camera, we’ve captured everything from pumas and ocelots to sloths and kinkajous — all kinds of different critters,” he shared.
Téllez (L) and Schipper (R) set a camera trap. © Sandra Leander
Private Jaguar Conservation

The research team also joined forces with a private jaguar conservation effort centered at Las Alturas del Bosque Verde — a sprawling, 32,000-acre ranch in the southwestern part of the country. Here, armed guards who live on the property work around the clock protecting a large population of jaguar from poachers.

“This situation is fairly unique. We’re talking about doing conservation on private land outside a protected area like a national park, so this becomes a different challenge,” Schipper shared. “This farm is the upper anchor to the proposed corridor. The Osa peninsula and Corcovado National Park create the lower anchor. These two points are where we are synthesizing this corridor.”

Several hundred residents also live on the property in a tiny village, much like they did 50 or 60 years ago. Schipper and González-Maya often reach out to the community, teaching school children about the animals that live in their backyard.

“It’s really complex because you need to consider all the interests people have in using the landscape for obviously, economic and social reasons. But then, you have the cultural aspect of conservation, which is how people approach the nature, how people use nature and how people benefit from nature. At the end, conservation only works when you involve people and help them understand that they need the ecosystems to survive,” said González-Maya.

Ultimately, both humans and the jaguar need the rain forests to survive. But the jaguar’s fate may also depend on whether a culture and the mindset of younger generations can be changed to reflect the importance of conserving the big cats and the forests.

“Reaching the children is an important impact we can have. We hope the kids go home and tell their parents what they’ve learned, and maybe, if their dad is a poacher or hunter, the kids can apply a little pressure,” declared Schipper. “Maybe over time, changing the mentality people have will reach a newer generation that will not want to hunt jaguar. Maybe they can give up some of the habits of the older generation in terms of illegal poaching, hunting and cutting down the forest.”

Update: Schipper’s research team has completed a draft of its proposed wildlife corridor in Costa Rica. Now, the team is refining the borders, deciding who to work with and what conservation strategies to employ.

Jan Schipper is a Conservation Research Postdoctoral Fellow in a partnership between ASU School of Life Sciences and Phoenix Zoo-Arizona Center for Nature Conservation. The Mikelberg Family Foundation, Las Alturas del Bosque Verde, ProCAT, Phoenix Zoo and Arizona State University helped make this research project possible.
The benefits of biodiversity conservation, and the costs of its neglect, are interests that transcend national borders. Few know this as well as Andrew Smith, professor with the School of Life Sciences at Arizona State University. Smith has spent his entire career, beginning with his senior thesis at Berkeley, studying characteristic members of the lagomorph family: the pikas.

Many of these small, furry animals reside in Asia. Smith explains that pikas (Ochotona iliensis) can be easily divided into two categories: rock-dwelling and meadow pikas.

"Their life histories are completely different," said Smith. "Rock-dwelling pikas have low reproduction, and are long-lived. On the other hand, meadow pikas, such as the plateau pika, are considered by the Chinese government to be an agricultural pest due to their high reproductive capacity and abundance."

To suppress large populations of pikas that thrive on the high alpine grasslands of the Qinghai-
Tibetan Plateau, Chinese agricultural agencies have distributed poison throughout massive swaths of land. Indeed, the poisoning worked too well — killing not only pikas, but seriously compromising much of the biodiversity on the plateau as well as its potential for ecological sustainability.

“In China I wear many hats,” Smith says, in reference to his roles as a behavioral ecologist, conservationist and instigator of political change. For example, as part of the China Council Biodiversity Working Group, he was among the first to suggest more sustainable methods for timber harvesting, shortly before a massive loss of life and property from flooding along the Yangtze River that resulted from the clear-cutting of primary growth forest. This then led to a ban on the harvest of primary growth trees in China.

In 1999, Smith co-published a paper with ASU doctoral student Marc Foggin in the journal “Animal Conservation” that introduced the plateau pika as a ‘keystone’ species.

“It's really clear if you poison the pika, all the native birds that nest in pika burrows, and all the mammalian and avian carnivores that rely on the pika for food, will disappear,” said Smith. Soon after his paper was published, the Chinese Academy of Sciences translated the article and had it read aloud before voting on whether the pika was a keystone species or a pest. Although the academics overwhelmingly supported its newfound status, poisoning campaigns continued.

Professor Andrew Smith discusses research with School of Life Sciences graduate and local resident, professor Badingqiuying. © Maxwell Wilson

Much of this poisoning has occurred in the Qinghai-Tibetan Plateau, which is an enormous watershed in western China that covers approximately 25 percent of the country. More than 1.4 billion people depend on the proper functioning of this so-called “Water Tower of Asia.” This situation garnered the interest of ASU graduate student Maxwell Wilson. Wilson studied for his Master’s degree with Smith, and is now completing his PhD with Jianguo Wu, a landscape ecologist who is also a professor with the School of Life Sciences.

Wilson became interested in how the plateau pika, which dig burrows, influence the hydrology of the region. He developed techniques for measuring the infiltration rates of water on sites that had been heavily poisoned, and on sites that had not been poisoned (where pika were abundant).

“Even without statistics, our results are quite clear,” said Wilson. “Where the pikas are poisoned, burrows collapse and the ground cannot quickly absorb water. This may cause damaging overland runoff — basically, massive amounts of water moving unrestricted across a sloping terrain.”
Wilson and Smith, who have dubbed their work as one of the few examples of ecohydrology, both note that this recent result has turned the heads of Chinese academics and politicians alike. Wilson makes the point that with his findings on water infiltration rates, the list of reasons for continuing to poison plateau pikas is rapidly dwindling. “Everything in China happens really quickly,” Wilson noted about the shift in attitudes toward biodiversity conservation. “Since we began work there in 2010, there has already been a noticeable change in the relationship between the public and wild animals.”

Clockwise: A pika sits next to research equipment; Himalayan blue poppy; plateau pikas participate in many social behaviors, such as nose rubbing.
Smith and Wilson have made tremendous strides toward working with the Chinese on proper management of the abundant and rapidly reproducing plateau pika. But many miles away, in the Tian Shan mountains in northwest China, another pika species presents a problem that is nearly opposite that of the plateau pika. The Ili pika (*Ochotona iliensis*) is an asocial, rock-dwelling species that had seemingly faded out of existence. It was discovered in 1982 by a Chinese researcher named Li Weidong, but he would not see another living Ili pika for more than 20 years. Until recently, the only clues that suggested their continued existence were the hay piles this species constructs and fresh dung.

Smith, who met Li in 1988, has worked closely with him and supported his work. During one of Li’s recent expeditions to estimate the remaining numbers of Ili pika, one of the rusty-eared critters not only came into his sight, but also bounded across his boot! Unfortunately, influencing political change for this particular pika has proven even more difficult than...
finding the animals. His efforts to push for protected areas have fallen on deaf ears.

What has caused the decline of the Ili pika?

"I think the main cause is the increasing population pressure of local pastoralists," said Smith. "They have mastiff dogs which basically are kept on these thick, chain leashes during the day and they're taken off at night to keep the wolves away." Apparently, Smith added, these mastiffs may forage on local wildlife, which could include the endangered Ili pika. However, it's difficult to pinpoint the cause because as Smith puts pointedly, "If you haven't seen the animal in 20 years, how can you say scientifically, what has caused this?"

Although the trigger for this animal's precipitous decline is unclear, what is certain is that without further investigation or intervention, the lagomorph family may soon find itself a member short.
When Libby Larson was a child growing up in Connecticut, she had little interest in nature. Her mother tells her that she didn't even like to go outdoors.

Surprising for someone who has spent much her adult life outside — as an ecologist!

It wasn't until Larson, a School of Life Sciences alumna, volunteered for a wetlands cleanup in Boston — where she lived after earning an undergraduate degree in history — that the idea of pursuing ecology occurred to her. During the cleanup, she said she discovered an entire world she never knew could exist within a city.

“A lot of people have this idea that nature only exists outside of cities,” Larson said. “I was really excited to learn a new perspective on the environment around me.”

She went back to school to make ecology her life’s work. After taking prerequisite courses and applying to graduate school, she chose Arizona State University for its openness and interdisciplinary nature. She said she enjoyed feeling like she could talk to anyone from any area of science about anything.

“That’s not something that’s universally true at other universities,” Larson said. “I found SOLS to be an awesome place to be on a lot of different levels.”

Larson joined School of Life Sciences professor Nancy Grimm’s lab and worked on a number of projects with the Central Arizona-Phoenix Long-Term Ecological Research project and the National Science Foundation’s Integrative Graduate Education and Research Traineeship in Urban Ecology. In 2010, she completed ASU’s PhD program in urban ecology.

More than anything, Larson credits her success to the extra-curricular activities in Grimm’s lab. She learned how to parse scientific literature during reading groups, which were often set up to be fun and engaging. Since Larson came from an undergraduate experience without ever writing a single lab report, that kind of assistance with academic acclimation was crucial to her success.

Her favorite part of the experience, she said, was getting to work with so many other scientists from other fields.

“It wasn’t until I left ASU that I realized it’s way ahead of the curve when it comes to interdisciplinary research,” Larson said. “It’s really pretty special and, unfortunately, unique.”

Since graduating, Larson found a home at NASA through the American Association for the Advancement of Science’s science and technology policy fellowship. The program places PhD holders at federal agencies where they can help bring a more scientific perspective to policy-making.

On a daily basis, Larson is helping NASA find the scientists who want to study some of the most important ecological questions facing the country today. By facilitating and providing funding for research that may help preserve the planet, Larson said she couldn’t be happier with the path she has chosen.
Evolutionary biologist Justin Congdon arrived at Arizona State University in 1972 and the timing could not have been better. As a graduate student with the Department of Zoology, his studies coincided with the temporary stay of professor Donald Tinkle — the university’s Maytag Professor and expert in evolutionary biology. Since Tinkle’s appointment was only for one year, if Congdon had waited to enroll, he never would have taken the class that changed his life.

Congdon took an evolutionary ecology class taught by Tinkle and to this day, says it was his favorite part of ASU. He describes the class as an “eye-opener.” He enjoyed working with Tinkle so much that he volunteered to help with field studies. Eventually, he was hired. Studying under such a big name in the fields of herpetology, ecology and evolutionary biology pushed Congdon and his peers to work harder than ever before.

“We were lucky enough to have a good group of graduate students and that was special,” Congdon said. “We encouraged each other; we stimulated each other.”

While researching methods to measure the reproductive efforts of lizards in the Chiricahua Mountains in southeastern Arizona, Congdon co-published more than 10 papers in several renowned scientific journals. Because of that hard work, he received an offer to join the University of Michigan as a post-doctoral researcher and work with Tinkle, despite not actually finishing his PhD program.

Congdon didn’t come back to Arizona for decades. It wasn’t until he began missing ASU and the Chiricahua Mountains that he found a reason to return.

He started a study on the Sonora mud turtle, which only had four papers written about the species before Congdon’s 1990 project. After retiring from a research scientist position at the University of Georgia’s Savannah River Ecology Laboratory, Congdon came back to Arizona to stay.

After his return, Congdon felt a need to start giving back to ASU. He said he frequently contributed to scholarship funds at other universities and he loved helping the next generation of students. To date, Congdon and his wife have provided more than $16,000 to fund vertebrate research at the School of Life Sciences.

“Other people helped us when we were students, we appreciated it and now we’re trying to help the next generation be successful,” Congdon said. “I don’t know about other people, but I’ve seen graduate students go on to do some really great things, and a couple have just startled me with how talented they were. It’s just really nice to help make that possible for students.”

Though he retired some time ago, Congdon still finds it important to stay involved in ecological sciences. Whether by continuing his research or making sure others in the School of Life Sciences can afford their own projects, he said he doesn’t plan on stopping any time soon.

After his mentor Donald Tinkle passed away in the late ’70s, life sciences alumni Justin Congdon took over his turtle research project at the University of Michigan. The study continued for 33 years longer under Congdon. Owen Kinney
When Evan Carson first started researching freshwater fish in the desert springs of northern Mexico, he realized many species were in danger of extinction. Local communities use a tremendous amount of water from the springs at Cuatro Ciéñegas — threatening the native wildlife.

But with research skills he learned at Arizona State University, Carson has helped those same communities understand why the local plant and animal species in their valley are worth protecting. Carson, currently a research assistant professor with the University of New Mexico, regularly shares his research findings with local conservation groups and land-managers that have the power to create positive change.

Carson said he didn’t always intend to take such an active role in preserving threatened species. As a young child, he had a fascination with wildlife, but it wasn’t until he got older that he realized he wanted to protect it. When he had an opportunity to join ASU’s biology PhD program and study with then professor Thomas Dowling, he jumped at the chance.

“A lot of people around the Southwest were doing really good work, but I thought Tom’s team was the best,” said Carson, an ASU Class of ’05 graduate. “I felt I could go to people with the School of Life Sciences, who all had very different expertises, and learn a lot from them.”

Carson first conducted research in northern Mexico through a school project. As a graduate student, he traveled with the late professor W. L. Minckley to the Chihuahuan Desert to study unique organisms at Cuatro Ciéñegas. There he saw the incredible diversity of the desert fishes, but quickly realized how they were being threatened by local farming practices.

“The more I came to understand how many of these species could actually be wiped out, the more concerned I got,” Carson said. ‘And many of them are not only endangered, but unnecessarily so.”

Much of Carson’s current research is conducted with that belief in mind. By working alongside non-governmental organizations in Mexico such as ProNatura Noreste, he can partner with local communities to help bring stability to endangered ecosystems. Sometimes that involves educating those who are damaging the habitats by drawing too much water out of the desert springs. Other times, it may mean expanding existing habitats or even creating artificial ones.

One of the most interesting things about habitat restoration, he said, is how local citizens take pride in the species unique to their land. According to Carson, people are eager to learn more about sustainable agricultural practices so that the local wildlife can start to thrive again.

While Carson says his role as a scientist precludes him from being a true activist, he said he is satisfied knowing that his research helps these communities understand the importance of protecting the native species found nowhere else on Earth.
With large, hooked beaks, sharp talons, and a wingspan of up to 7.5 feet, golden eagles are powerful and formidable birds of prey.

For biologists who research birds of prey, trapping and tagging them are often the most time-consuming and dangerous part of studying these incredible animals. In addition, golden eagles often make their nests in tall trees or on cliffs along waterways.

“It can take weeks to catch a single bird and, although rare, an eagle can be injured during trapping operations,” said biologist Todd Katzner, a 2003 Arizona State University School of Life Sciences alumnus who studies both golden and Eastern imperial eagles. “As a consequence, it is really beneficial to find ways to study eagles without ever trapping them.”

Unfortunately, it was the only option for scientists who were tracking bird populations at the time.

But one day, while conducting research on the ecology of birds of prey in Kazakhstan, Katzner had an epiphany. Looking around the ground, he realized there were Eastern imperial eagle feathers scattered everywhere.

“I started thinking that since we were already collecting tissues from the birds, there had to be something we could do with these feathers,” said Katzner, who was a doctoral student at the time. “So, I started talking to some geneticists and we realized there was a critical question we could answer by using these samples: What is the death rate of these birds?”

By analyzing the DNA in the feathers from around a nest, Katzner realized he could track where every individual in an eagle population lived without ever having to directly interact with the birds.

Since eagles typically stay with one mate in one nest until they die, analyzing the feathers over a period of time can tell researchers whether the birds in a specific area are thriving or dying. It also tells them what parts of a habitat cannot be disturbed without causing eagles serious harm.

Katzner said no one had been able to accurately estimate eagle populations before the creation of this tracking method. He happily credits the School of Life Sciences and its faculty for their contributions to his success.

“I had a really positive experience at ASU,” Katzner said. “People challenged me — asked me hard questions. And I think, at the time, it seemed painful. But in the long run, it was the best thing those people could have done for me.”

After holding several post-doctoral positions, his dream job became available at the U.S. Geological Survey.

Today, much of his job centers on keeping North American golden eagles safe from a serious threat — the development of wind energy. Eagles that fly below certain altitudes are at great risk of being killed by wind turbines. His job is to determine whether it’s safe to build the turbines in certain habitats, by finding areas where eagles fly high enough to avoid the blades. Katzner does this by using his feather tracking method.

Using the research and tracking skills he developed at ASU, Katzner said his efforts to protect the country’s golden eagle population have already been successful, while also allowing the U.S. to safely gather renewable wind-energy.

“I’m thrilled with what I’ve been able to accomplish,” Katzner said. “This type of work is really what I’d hoped graduate school would allow me to do, and I feel fortunate that it has all worked out so well for me.”
Editor’s note: ASU School of Life Sciences professors Ben Minteer and Stephen Pyne recently published a unique collection of essays focused on the future of conservation and environmentalism in light of global climate change and the Anthropocene.

The pair feature a wide variety of prominent conservation voices from the perspectives of history, ecology, science journalism, policy and philosophy. These creative contributions kindle valuable conversations on the future of species and wildlands, as well as on the challenges of managing our natural resources in an era of rapid environmental change.
Q: Why this book?

Ben: This is an idea whose time had come. We are both concerned about nature protection and its American traditions. Me, from the perspective of ethics, Steve from history. The Anthropocene means many things, and a lot of ideas are being batted around — some of them a bit strange — to deal with it. We wanted our disciplines to contribute. And, we wanted the best of our old traditions identified and preserved.

Steve: It was Ben's idea. We had collaborated on an essay earlier on pragmatism and conservation — frankly one of the few collaborations that left me willing to work with someone again. I expanded Ben's range of disciplines and acted as a sounding board as we discussed the character of the essays and of the anthology as a whole.

Ben: Really, it came together quickly; pretty painless as these things go. We were able to enroll some great minds. They wrote good pieces - very engaging - and we kept them short, not more than 2,500 words. We wanted people to make their point and say what they wanted with some grace.

Steve: We imagined it as a salon — a moving conversation among philosophers, historians, scientists, writers, agency administrators and activists. Our contributors really came through. Our job as editors was pretty simple.

Ben: Well, not everyone made the deadlines and a few dropped out. But, yes, they were professionals. Once we started collecting drafts and circulating them among our writers, the discussion really started to take off.

Steve: And Mark Klett lent a terrific photo and let us crop it for the cover.

Ben: It's a stunning image.

Q: What did you conclude?

Ben: We're not making an argument. It's a conversation. Curt Meine believes this is no time to jettison our hard-won experience, particularly on wilderness and biodiversity preservation. Erle Ellis thinks we have no choice but to "ride the tiger."

Steve: And, whatever the power of our ideas, Norm Christensen and Jack Ward Thomas note how hard it is to implement what we want without irony and blowback. Mostly our contributors are cautious, or maybe chastened, about defining the problem and what we can do about it.

Ben: That's what distinguishes our book from the growing herd. We're not taking either side.

Steve: We just accept that some fundamental conditions have changed and will continue to challenge what we think and how we act.

Ben: We're serious, but I hope not solemn, and we deal with real ideas, not slogans. 'After Preservation' is an invitation to pause and think carefully. It's a meditation, not a call to arms.

Steve: I guess we're about to find out if there is an audience for intellectual non-partisanship or not.

Ben: Right. But at the same time, it wasn't all a garden party. Dave Foreman nearly peeled the paint off the walls with his repudiation of the 'Anthropoceniacs.'

Steve: That he did.

Q: How did you become interested in the subject?

Ben: For me, it was a frustration with the way the Anthropocene debate seemed to be shaping up. Some boosters of the idea appeared almost giddy about the notion of greater human control of the planet. They push things too far. But the knee-jerk preservationist response often avoids some of the hardest questions. How do we direct and contain our outsized influence on the landscape given that we really can't turn back the ecological clock? It looked to me like another stalemate, and so I began thinking that we needed to move the discussion into some new territory.

Steve: For a fire historian, the transition to the concept of an Anthropocene is easy. When humanity, the Earth's keystone species for fire, decided to burn lithic landscapes instead of living ones, the planet's natural history underwent a phase change. Fire is not just a symbolic clock? It looked to me like another stalemate, and so I began thinking that we needed to move the discussion into some new territory.

Ben: We both wanted to show our disciplines — the humanities, generally — had something to contribute. I just thought it would be interesting if we could ask some of the best and brightest a simple question: What's living and what's dead in the idea of nature preservation?

Steve: Think of our salon as Plato's symposium on its feet.

Ben: Much of the discussion must hinge on values. But we also feel that it needs to be grounded in a deeper understanding of history. There's a sense in which some of these new debates are sounding themes that have divided conservationists for generations.

Steve: That kind of reflection can get drowned in the din of cries that we are amid a crisis. We wanted those voices heard.

Q: Do you see a sequel?

Ben: We're discussing possible follow-up events, maybe a select workshop on the ground somewhere. And I have an idea for a second book, a kind of spin-off project that focuses more on the photographaphic traditions surrounding the wild. [Turns to Steve] What do you think, are you up for another ride?

Steve: You do the index next time.
Faculty Awards and Honors 2015

Assistant professor Joseph Blattman was given the Centennial Professorship Award by the Associated Students of Arizona State University. The award honors his innovative approaches to teaching immunology in undergraduate courses.

Assistant professor Sara Brownell was honored with ASU’s Centennial Professor Award, a university-wide teaching award aimed at recognizing engaged scholarship, emerging leadership, dedication to community service and demonstration of student-centered practices. Also, the American Society for Cell Biology selected one of her articles for the 2015 Highlights edition of the CBE-Life Sciences Education journal.

Assistant professor Hinsby Cadillo-Quiroz’s proposal to study the microbial composition of tropical peatlands was accepted by the Joint Genome Institute Community Science Program.

The Pathologist, an online journal for the field of pathology, named professor Carolyn Compton as one of the top 100 pathologists in the world.

Assistant professor Sharon Crook was awarded a $1,505,557 grant from the National Institutes of Health to further society’s understanding of how the nervous system works. Crook will study the nervous system by building computer models of neurons and neural circuits.

The ASU School of Life Sciences awarded Regents’ and Parents’ Association Professor James Elser with the Teaching Excellence and Innovation Award. The award recognizes his innovative teaching in the BIO 151 course. He also received the ASU Founders’ Day Research Achievement Award for his research on phosphorus sustainability and ecological stoichiometry.

President’s Professor Jennifer Fewell was named a fellow of the Berlin Wissenschaftskolleg for the 2016-17 academic year. During that time, she will write a book on the evolution and organization of division of labor in natural societies.

iDigBio and University of Florida awarded a $12,669 grant to Nico Franz, associate professor and curator of insects at ASU Natural History Collection, and project coordinator Anne Basham. The grant will go toward the development of a computer application that uses 3D models of museum specimens.

Professor Leah Gerber was elected to the Ecological Society of America’s Board of Governors.

Assistant research professor Richard Gerkin was named the DREAM Olfaction Prediction Challenge Champion. The global competition tasked entrants with predicting the smell of compounds by using only their molecular structure.

Professor Nancy Grimm delivered the 30th Annual Eugene P. Odum lecture at the University of Georgia. She presented a talk that synthesized her more than 35 years of research in the Southwest, entitled “The Only Certainty is Change: Reflections on a Stream, a City and a Public University.” She also gave this year’s Jenner Memorial Lecture at the University of North Carolina and taught a weeklong course at Michigan State's Kellogg Biological Station as an Eminent Ecologist.
Professor Jon Harrison was given the August Krogh Distinguished Lectureship by the Comparative and Evolutionary Physiology Section of the American Physiology Society. He will give a lecture at the 2016 Experimental Biology meeting. He also received the ASU Faculty Women's Association Outstanding Faculty award for his commitment to mentoring.

Associate professor Shelley Haydel received a number of grants for her research on tuberculosis. She was awarded a $40,000 grant from the Potts Memorial Foundation, a $200,000 grant from the Robert J. Kleberg, Jr. and Helen C. Kleberg Foundation and a $5,000 grant from the School of Life Sciences Research Advancement program. She also earned the ASU College of Liberal Arts and Sciences Undergraduate Summer Enrichment Award.

University, Regents' and President's Professor Jane Maienschein was awarded the David L. Hull Prize by the International Society for the History, Philosophy and Social Studies of Biology. She was recognized as the person this year who most exemplified Hull's commitment to interdisciplinary scholarship and service.

The National Institutes of Health awarded assistant professor Marco Mangone with a $354,238 grant to map the molecular pathways targeted by microRNAs, which drive cancer initiation, progression and metastasis.

Professor Kevin McGraw received a $19,000 doctoral dissertation improvement grant from the National Science Foundation to help support the research of his graduate student, Brett Seymour.

The Human Behavior and Evolution Society awarded Randolph Neese, professor and director of the Center for Evolution and Medicine, with a Lifetime Career Award for Distinguished Contribution. His selection was based on his contributions to the field of evolutionary medicine and his efforts to make evolutionary biology a foundational part of medical school curriculum.

Regents' Professor Stephen J. Pyne was awarded a Recognition of Merit by the Global Wildland Fire Network at the 2015 International Wildland Fire Conference. The award honors his work as an environmental historian. He was also recognized for his 28 years of teaching the “Fire Ecosystems Management” course at the National Advanced Fire and Resource Institute.

The American Society of Mammalogists awarded President's and Parents Association professor Andrew Smith with the Aldo Leopold Award. This honor is given to a well-established individual who has made a lasting contribution to the conservation of mammals and their habitats.

The American Physiological Society awarded associate professor Karen Sweazea with the New Investigator Award in the Comparative and Evolutionary Physiology section. The honor recognizes an outstanding investigator in the early stages of her career.

The American Genetics Association awarded assistant professor Melissa Wilson Sayres with a $15,000 grant to study the molecular evolution of sex. The funds will support an ASU-hosted conference focused on the molecular and evolutionary biology of sex determination, sex chromosomes and recombination.
Whale Trust Maui awarded Yayir Astudillo-Scalia, a doctoral student studying environmental life sciences, a $2,500 grant to research humpback whales in Maui, Hawaii.

PhD candidate Liz Barnes was awarded a graduate research fellowship by the National Science Foundation. From 16,500 applicants, Barnes was one of 2,000 selected.

Graduate student Stephen Blazie was awarded the Genetics Society of America’s Poster Award – Honorable Mention in the Gene Regulation and Genomics Category.

ASU awarded doctoral candidate Evan Brus with the Peabody Family Memorial Graduate Fellowship. The $1,242 award will fund the cost of his doctoral research on the transmission and persistence of chytridiomycosis.

Doctoral candidate George Brusch IV was awarded a $750 grant as a part of the Arizona State University Graduate and Professional Student Association’s Graduate Education, Graduate Research and Support Program. This will help Brusch travel to the Bahamas to study eco-tourism impacts on marine iguanas.

Graduate student Steffen Buessecker was awarded a $600 travel grant from NASA to attend this year’s Astrobiology Science Conference in Chicago.

The Rob and Melanie Walton Sustainability Solutions Initiatives program has given Bang Iong Chan the $4,463 Global Sustainability Studies Program award. This will provide funding for Chan to study abroad in Morocco.

Yasmynn Chowdhury, an undergraduate studying cellular and molecular biology, won the American Association for the Advancement of Science’s Student Poster Competition in the Cellular and Molecular Biology category. She will be recognized for her achievement in the spring issue of Science.

Doctoral candidate Federica Turriziani Colonna has been appointed to the Student Advisory Committee of the International Society for the History, Philosophy and Social Studies of Biology. As a member, she will help plan an upcoming meeting in Sao Paulo, Brazil.

Doctoral candidate Jessica Corman’s dissertation talk at the 2014 Joint Aquatic Sciences Meeting was named the Best Oral Performance in basic research.

Doctoral candidate Samantha Day has received the Mayo Clinic/ASU Obesity Solutions Research Funding award. This seed grant provides funding for an innovative research project in the field of obesity research.

Doctoral candidate Francesca De Martini was given the Lisa Dent Ecology fellowship for 2015-16. This fellowship is provided to female PhD students studying ecology, and in memory of Lisa Dent, an ecology graduate student in ASU’s biology program from 1994-1999.

Doctoral candidate Steve Elliot was named a Spirit of Service Scholar by ASU’s College of Public Service and Community Solutions to acknowledge his work as editor-in-chief of ASU’s Embryo Project Encyclopedia.

ASU awarded graduate student Tara Furstenau a $500 Graduate Travel Award to attend the annual meeting of the Society for Molecular Biology and Evolution in Vienna, Austria.
Student and Staff Awards and Honors 2015


ASU School of Life Sciences awarded graduate student Robin Greene a $1,058 Research Advancement facilities grant to fund specific research methods using university facilities.

NASA and Arizona State University awarded graduate student Jessica Guo a $9,000 NASA Space Grant. The grant allowed her to create a STEM outreach program that included a three-week statistics course, and also allowed her to mentor high school students on the statistics component of their senior research project.

The National Science Foundation awarded graduate student Amalia Handler the NSF Graduate Research Fellowship. The fellowship assists outstanding graduate students in NSF-supported science, technology, engineering and mathematics disciplines.

Brian Haney, a graduate student in the animal behavior PhD program, was awarded a $17,689 grant from the National Science Foundation. This grant will fund a resource supplementation experiment focused on how multi-queen ant colonies have evolved.

Graduate student Jordan Harrison received a $117,252 grant from the National Institutes of Health to fund research on a novel method of therapy to protect against strokes and cardiac arrest.

The Amazon Climate Research Grant Program awarded PhD candidate Jianhua Huang a $15,000 grant to study the impacts of climate change on energy consumption in buildings.

Doctoral student Pierce Hutton received a $400 grant from Sigma Xi to investigate how urbanization alters sleep dynamics in songbirds. He also received a $2,000 graduate research support program award from the Arizona State University Graduate and Professional Student Association and a $1,500 ASU RTI Facilities grant.

The Aldo Leopold Foundation published a photo taken by Sandra Leander, Manager of Media Relations and Marketing, in its Summer 2015 issue of The Leopold Outlook magazine. The issue’s theme is “Soils.”

Jason Maarsingh, a master’s student studying biology, received a $1,064 grant from the ASU Graduate and Professional Student Association to research treatments for resistant strains of tuberculosis.

The Arizona State University’s Graduate and Professional Student Association has awarded doctoral candidate Natalie Mitchell with a $485 jumpstart grant to support her research, in which she uses immunoglobulin coated magnetic beads to extract protein biomarkers from human plasma.

Doctoral candidate Karla Moeller was awarded a graduate research grant by the Graduate and Professional Student Association to investigate behaviors exhibited by ant colonies that are in mutualisms with Cecropia trees.

Eric Moody, a PhD student studying environmental life sciences, received a $200 grant from the Desert Fishes Council to attend its annual meeting. He also received a $1,008 grant to fund his dissertation project researching intraspecific variation in a desert fish species.
Ernest Nkansah-Dwamena, a doctoral student studying biology and society, was awarded a $2,500 Fellowship for Graduate Training grant from ASU. The grant will support his research on the threats and opportunities of large-scale land acquisition on the development of nations in sub-Saharan Africa. He was also named a Spirit of Service Scholar by ASU’s College of Public Service and Community Solutions and received a $5,000 scholarship for being an outstanding student interested in a career in the public or nonprofit sector.

Shipping and Receiving Coordinator Richard Olson earned a 30 Years of Service award from Arizona State University President Michael Crow. The ASU Graduate and Professional Society Association has awarded PhD candidate Charles Rolsky with a Continuing Excellence Award. He also won last spring’s Teaching Excellence Award.

ASU awarded graduate student Bruno Sarda with the Sustainability Leadership Award for his work spanning corporate, community and academic activities.

Jessica Spring, a senior studying microbiology, earned an American Society for Microbiology Undergraduate Research Fellowship. The $3,000 award will support her research on greenhouse gases in the Amazon.

Graduate Programs Student Service Support Coordinator Wendi Simonson was awarded the Graduate and Professional Student Association's Annette Jecker Outstanding Staff Award.

The Arizona Field Ornithologists have awarded doctoral candidate Richard Simpson the $1,000 Gale Monson Research Grant to study the evolution of coloration and courtship displays in Arizona hummingbirds.

Research Advancement Manager Marj Townsend was named the Chair-Elect for the National Council of University Research Administrator’s Region VII.

Postdoctoral fellow Lee Tran won a number of awards at this year’s Experimental Biology meeting. He received two awards from the American Physiological Society — the Research Recognition Award and the Feature Topic Honorarium. He also won the American Society of Nutrition’s Emerging Leaders in Nutrition Award.

The Arizona Department of Agriculture Endangered Species Act – Section 6 Grant Program awarded PhD student Dustin Wolkis with a $20,649 grant to survey and assess wetland habitats in Arizona. He was also given the ASU College of Liberal Arts and Sciences Graduate Excellence Award for obtaining non-ASU funding. He also earned the Society for Ecological Restoration, Southwest chapter’s 2015 conference award for best student poster.

Doctoral student Jiseon Yang received a $2,500 Fellowship for Graduate Training from ASU to research the infection process when both a pathogen and its host are exposed to a spaceflight environment.
“Nature is not a place to visit. It is home.”

~ Gary Snyder
Help Save a Species

Researchers from ASU and Phoenix Zoo are studying *Atelopus varius*, a ‘Critically Endangered’ frog thought to have gone extinct after populations were decimated by the fungal disorder chytridiomycosis. This infectious disease eventually kills these amphibians, but not before it spreads to other frogs. A small population of *Atelopus varius* was recently rediscovered along the Rio Coton in Costa Rica. Unfortunately, the population tested positive for the disease, but there is still time to develop and implement a recovery plan to ensure this species does not go extinct.

To help rescue the *Atelopus varius* or to support ASU School of Life Sciences’ research and education in conservation, microbiology, molecular biosciences, biotechnology and biological sciences, please visit our giving page at:

[sols.asu.edu/giving](sols.asu.edu/giving)