



DEFINING SUCCESS

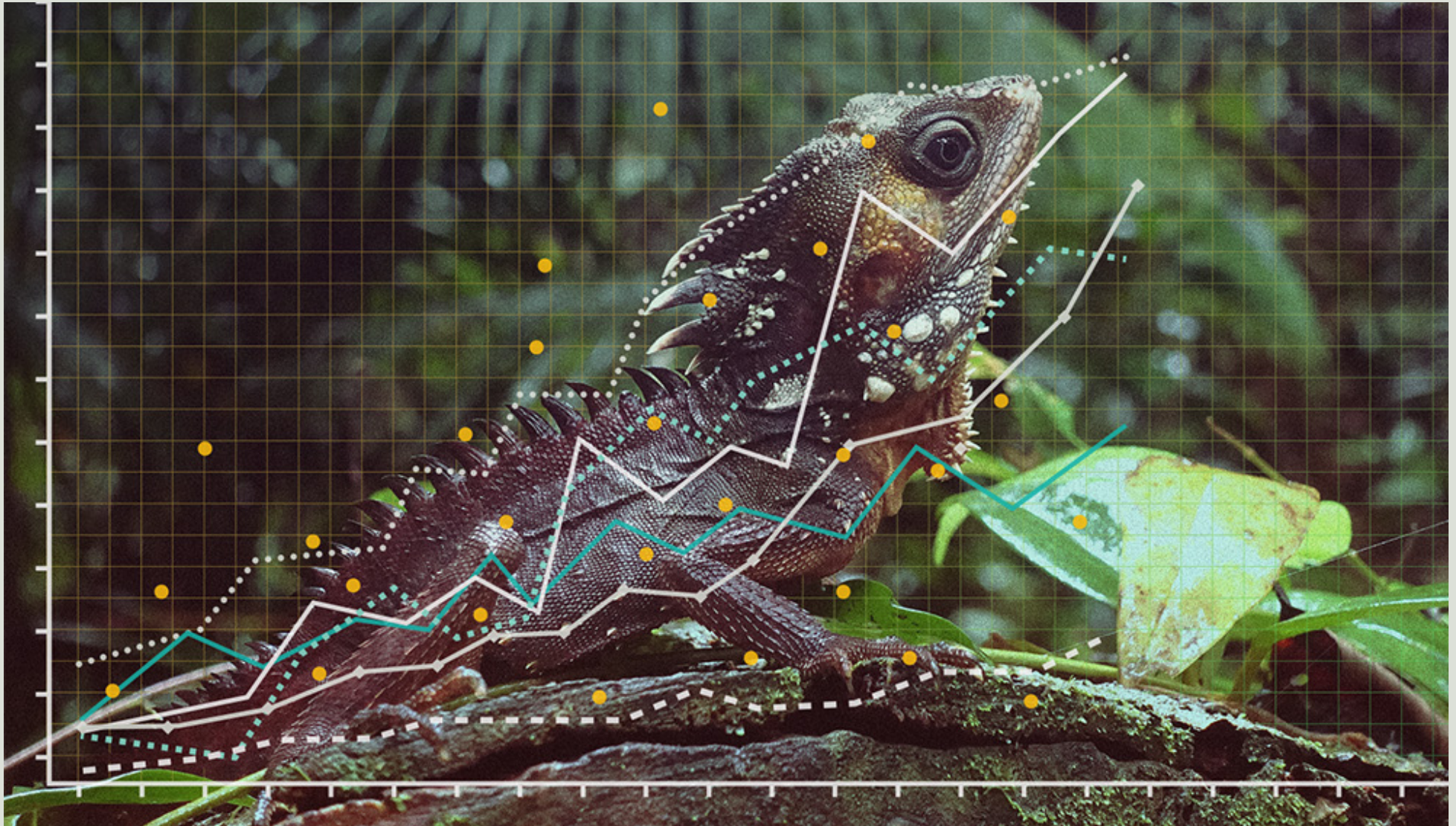
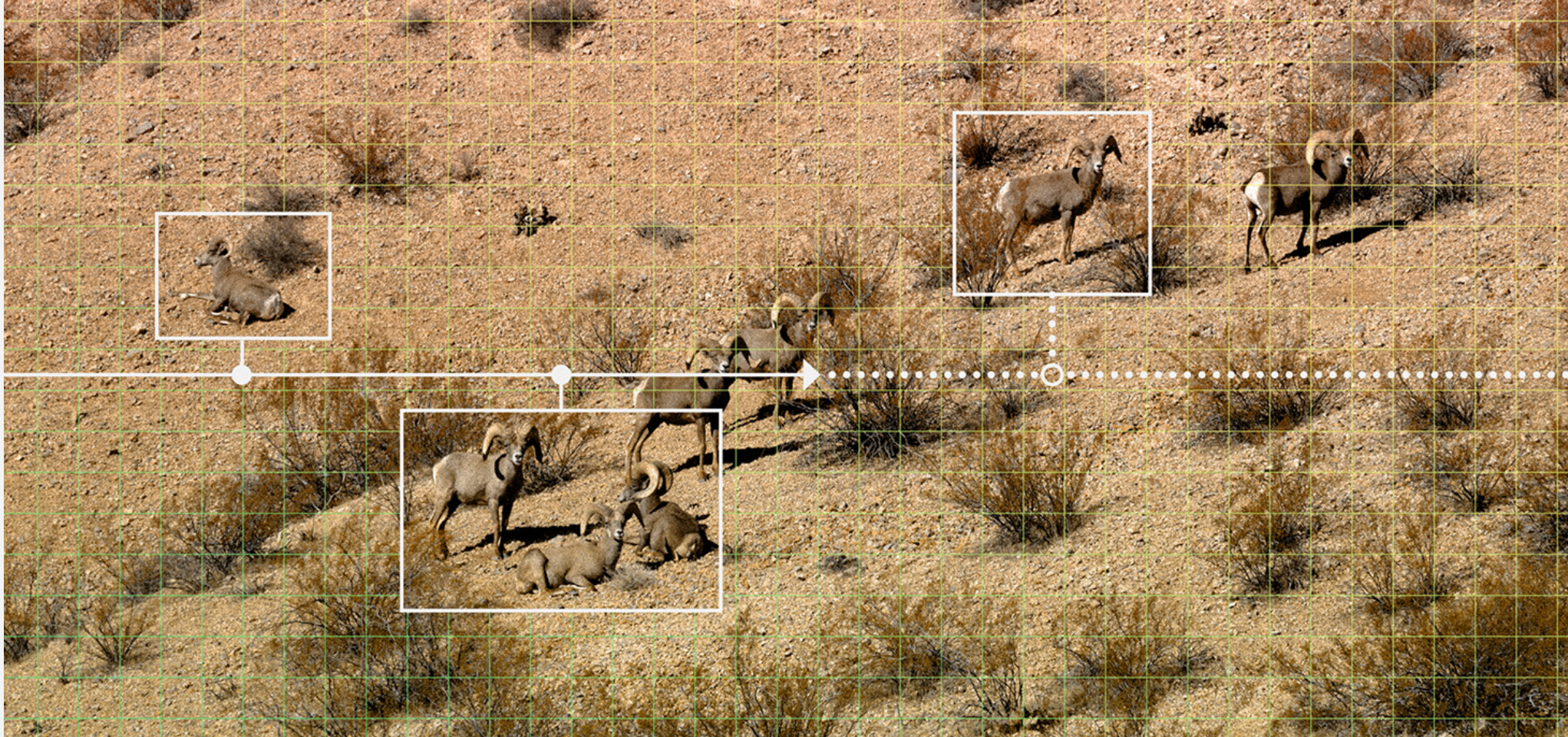


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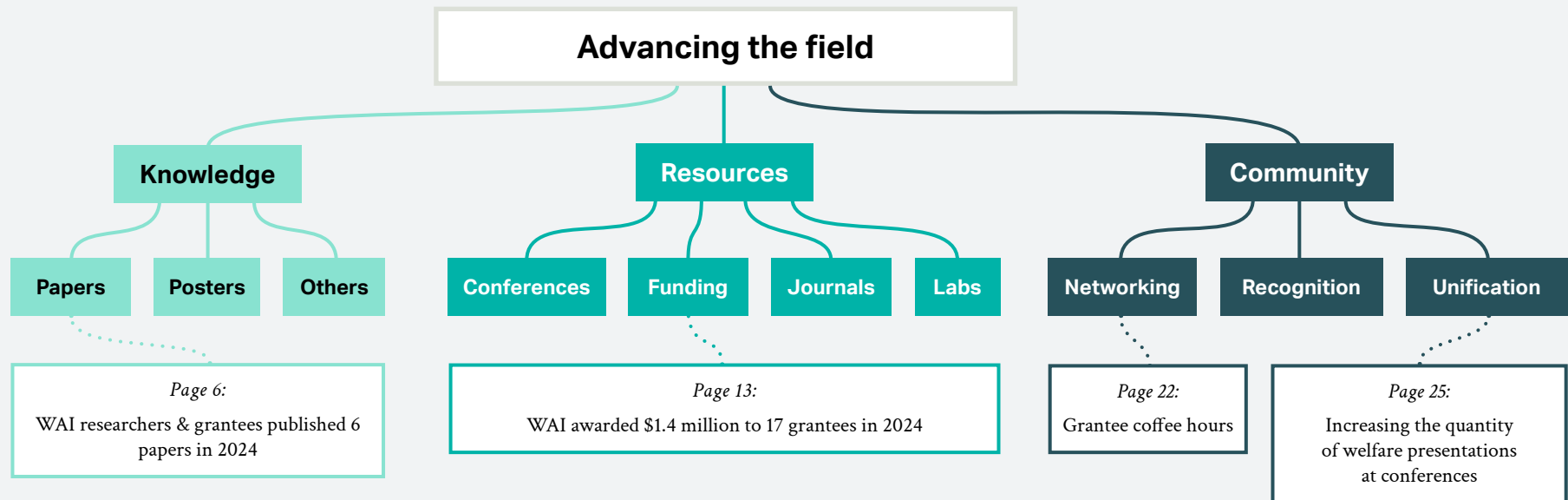


DEFINING SUCCESS

Wild Animal Initiative's mission is to **accelerate science that helps wild animals**. To achieve that, we are working to help wild animal welfare become a self-sustaining scientific field. If successful, this field will regularly generate sufficient science that wildlife managers, advocates, policymakers, and other practitioners have enough information to consider wild animal welfare science in their decision-making.

DEFINING SUCCESS

The field of wild animal welfare must have three features in order to successfully distinguish itself as an academic discipline and remain sustainable in the long term. These features are **knowledge, resources, and community**. The following pages explore each of these three features in depth.



KNOWLEDGE:

Information that can inform wild animal welfare management and practice.

A scientific field that doesn't produce sufficient information will not be able to support responsible interventions to help wild animals.

RESOURCES:

The support systems that make it possible for wild animal welfare scientists to do their work.

The community will not be sustainable or productive if it is under-resourced.

COMMUNITY:

A sustainable network of researchers that provides continuity, support, and exchange of ideas.

Wild animal welfare is a unifying field in that it brings together expertise from a range of disciplines — and practitioners in those disciplines will need to be welcomed to contribute.

Defining success

KNOWLEDGE

Information that can inform wild animal welfare management and practice.

Papers, posters, and other scientific outputs.

Advancing the field

Knowledge

Papers

Posters

Others

Page 6:

WAI researchers & grantees published 6 papers in 2024



THE YEAR IN RESEARCH

In addition to contributing important new knowledge to the field, publishing papers is key to forming connections with other scientists through collaborations and conference presentations.

When the Wild Animal Initiative Grants Program launched in 2021, we devoted the majority of our time and resources to ensuring its success, which meant shifting our focus away from publishing our own research. Since then, our grants and outreach work has helped our research team identify the areas where publishing their own work can best supplement the field. At the same time, our grantees are beginning to publish the results of their multi-year projects. The result is that **our researchers and grantees together published more papers this year than in the previous five years combined.**

We're extremely proud of the scientific community's response to our research, especially considering the small size of our research team and the additional duties they have beyond producing research articles.

Our key considerations when selecting research topics are which areas are most neglected, which are most likely to lead to an improvement in wild animal welfare, and which topics our research team is particularly well placed to work on. Some of our current priorities are removing roadblocks to measuring welfare, helping identify research areas that could result in interventions relatively soon, and building connections with disciplines that may not realize how much their work overlaps with wild animal welfare. You'll see these themes reflected in the topics below, which include connections between welfare and cognitive research, identifying new ways to measure welfare, and fertility control. We hope the summaries we've provided illustrate the value of these papers.





Papers published by the

WILD ANIMAL INITIATIVE RESEARCH TEAM

Michaël Beaulieu presents his biologging paper at Universities Federation for Animal Welfare (UFAW) 2024.

Taking welfare into account in comparative cognition research

Luigi Baciadonna, Janire Castellano Bueno, Vittoria Elliott, Christian Nawroth
Comparative Cognition & Behavior Reviews (2024)

Comparative cognition researchers typically study animals in captivity, where poor environmental conditions and unmet welfare requirements can negatively impact animals' welfare and cognition over their lifetimes. This can inhibit them from performing as well on cognitive tasks as their species is capable of. In this paper, Baciadonna et al. argue that designing comparative cognition research with welfare in mind is therefore vital — because meeting welfare requirements improves the experience of the animals being studied, and because it improves research quality.

Oxidative status: A general but overlooked indicator of welfare across animal species?

Michaël Beaulieu
Bioessays (August 2024)

Markers of oxidative stress — an imbalance of free radicals and antioxidants in the body — are present in all sentient animals and are directly connected to the nervous system. This makes them great candidates for welfare indicators, but researchers have so far made little use of them. This paper explores how markers of oxidative stress can be used to assess the welfare of wild animals. The paper is also itself a demonstration of how physiological and behavioral markers can be validated using existing research, rather than by conducting new empirical studies that might subject animals to potentially distressing experiments.

Improving wild animal welfare through contraception

Simon Eckerström Liedholm, Luke Hecht, Vittoria Elliott
BioScience (October 2024)

Most research on wildlife contraceptives has focused on potential harms they may pose, but contraceptives actually have the potential to benefit wild animal welfare by reducing population density. High population densities can cause depleted resources or increased disease risk, which in turn can mean higher stress, lower body condition, and lower survival rates. In this paper, Eckerström Liedholm et al. demonstrate that, under the right circumstances, targeted lowering of the reproductive rate could alleviate resource scarcity, leading to higher survival rates, improved body condition, and better welfare.

Plugging biologging into animal welfare: An opportunity for advancing wild animal welfare science

Michaël Beaulieu
Methods in Ecology and Evolution (December 2024)

Biologging is the practice of attaching electronic tags to animals to monitor physiological and behavioral markers, as well as the environmental conditions encountered by free-ranging animals in their natural habitat. Because most biologging variables may reflect animals' welfare, biologging has been recommended to assist researchers in describing captive animals' affective states. But distinct limitations may prevent extending this methodology to animals in the wild. This paper discusses how to overcome these challenges, indicating a path forward for the use of biologging in wild animal welfare science.

Papers published by

WILD ANIMAL INITIATIVE GRANTEES

Harnessing the gut microbiome: A potential biomarker for wild animal welfare

Sam Sonnega, Michael Sheriff

Frontiers in Veterinary Science (October 2024)

Aspects of the gut microbiome and its interaction with the host may serve as a reflection of an animal's health, stress levels, and emotional states. The gut microbiome is part of the causal chain linking an animal's brain to their fecal metabolites, which are often analyzed as a time-integrated record of physiological stress. In this paper, Sonnega and Sheriff demonstrate that this makes the microbiome a potentially useful biomarker for wild animal welfare. Measuring gut microbiome composition is also non-invasive, since fecal samples can be taken non-invasively in the wild.

Photos from left: Sam Sonnega and fellow researchers collect data in the field. Michael Sheriff.



A novel method to measure the impact of water quality on judgement bias in wild juvenile fish


Rafael Freire, Christine Nicol

Global Ecology and Conservation (October 2024)

Judgment bias tests are frequently used in animal welfare research. By measuring whether animals respond optimistically or pessimistically to various stimuli, researchers can infer something about their emotional states. The method typically involves training that requires animals under study to be kept in captivity. But in this paper, Freire & Nicol propose a novel method to measure cognitive bias in populations of free-living wild fish. Using this method — which can now be replicated by future researchers — produced evidence that aspects of water quality may lead to a negative bias in juvenile Murray cod. ■

Photos from left: Two scientists collect data in the Murray-Darling Basin, Australia. A small Murray cod floats in a container.





Research spotlight

WILDLIFE CONTRACEPTION

Contraception for wild birds and mammals has been researched extensively for the purpose of controlling populations. But it is also one of the most promising interventions for wild animal welfare that we've identified so far.

This fall, the scientific journal *BioScience* published our paper “Improving wild animal welfare through contraception,” authored by Strategy Researcher Simon Eckerström Liedholm, Science Director Luke Hecht, and former Science Director Vittoria Elliott.

In the paper, our researchers discuss a largely unexplored question: If we choose our methods and contexts carefully, can contraceptives improve the welfare of individual wild animals? Additionally, can we use contraceptives to improve their welfare even in cases where humans had not attempted to control the population before? The answer to both of these questions seems to be “yes.”

Your paper presents wildlife contraceptives as a potentially more humane alternative to conventional population management practices like poisoning and culling, and as a tool that could be used with the primary intention of improving wild animal welfare. How are those two things different, and what is the significance of that distinction for researchers and practitioners?

Simon Eckerström Liedholm: This distinction is subtle but important. In the near term, we might be posed with questions like whether to continue using a slow-acting anticoagulant poison or a type of wildlife contraceptive in order to control an invasive species. In that scenario, the use of the contraceptive is very likely to be preferable from an animal welfare perspective. But as our understanding of wild animal welfare and our ability to care for wild animals increase over time, we will be able to responsibly help animals live better lives — even in cases where humans are not directly impairing their welfare. It's possible that contraceptives would also have beneficial effects on wild animal welfare if the choice is between minimal or no management and the use of wildlife contraceptives.

What are the potential benefits of wildlife contraceptives, and where are we most likely to see them?

SEL: Using wildlife contraceptives to maintain the population at a lower level simply by reducing the birth rate should give established members of the population better access to resources. For instance, we might see juveniles become more likely to survive to adulthood because their parents will have fewer offspring to take care of, and they'll have fewer conspecific adults to compete with for food. For these reasons, some studies have found wildlife contraceptives to have positive effects on body condition and survival, which may indicate positive welfare effects.

We're most likely to see benefits in cases where high population densities mainly affect survival, rather than reproductive effort. There may be other contextual factors that affect the benefits, too, such as to what extent resources freed up by contraception are used in ways that benefit welfare. For example, if some bird species invest the extra resources in producing longer tail feathers to attract mates rather than improving fat reserves, it's less clear what the welfare effects would be.

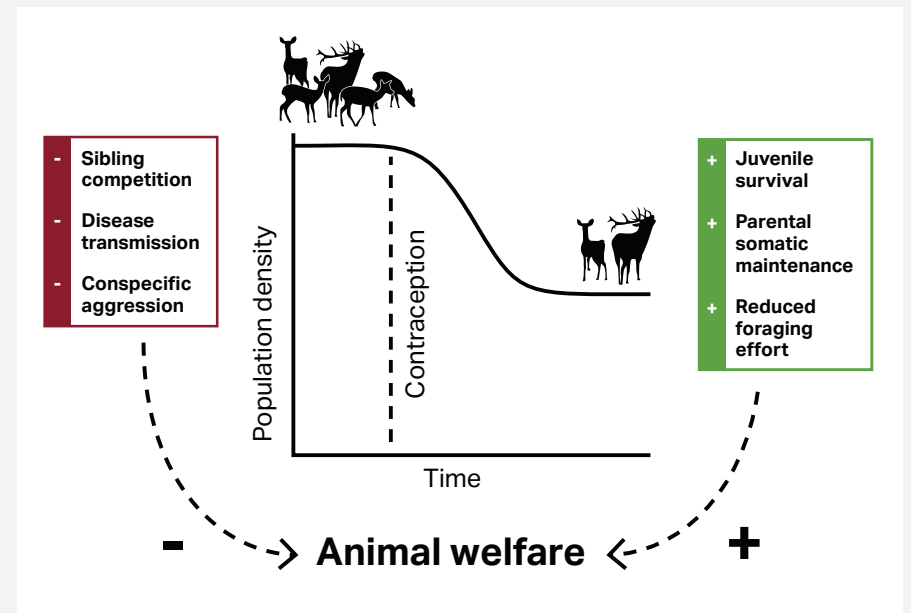
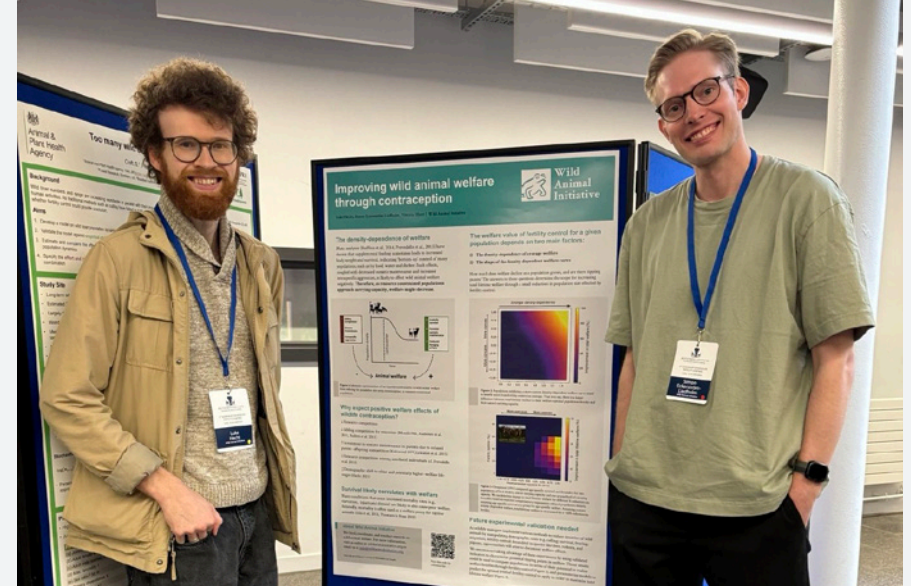



Photo at top: Luke Hecht and Simon Eckerström Liedholm present their poster at the Botstiber Institute for Wildlife Fertility Control conference. Figure: Schematic representation of the hypothesized benefits to wild animal welfare from reducing the population size using contraception in resource-constrained populations.

A photograph of three people standing on a grassy lawn in a park. On the left, a man with curly hair and a beard wears a blue and brown plaid shirt and khaki pants. In the center, a man with glasses and a yellow raincoat over a dark shirt and black pants is gesturing with his hands while speaking. On the right, a woman with short dark hair wears a black top and a red skirt. They are surrounded by trees with green and yellowing leaves, suggesting an autumn setting. In the background, a stone building and a fence are visible.

"The potential for the use of wildlife contraceptives to provide population-wide welfare benefits by reducing population density has scarcely been explored in the academic literature. **Our paper is one of the first to clearly draw the connection between these factors, and to suggest a path forward for exploring this connection further.**"

Why do we need more research on wildlife contraceptives, and what are the next steps?

SEL: Just like the health and happiness of humans and domesticated animals are important, the welfare of wild animals is morally important as well. But we know so little about what wild animals experience in the wild and how we can help them effectively.

The potential for the use of wildlife contraceptives to provide population-wide welfare benefits by reducing population density has scarcely been explored in the academic literature. Our paper is one of the first to clearly draw the connection between these factors, and to suggest a path forward for exploring this connection further.

Consequently, there are a lot of open questions, such as: What taxa and traits are likely to be associated with the largest benefits, and why? What are the welfare effects of the use of wildlife contraceptives for highly numerous commensal species such as pigeons and rodents? These and many other related questions can — and should — be answered by both empirical and theoretical studies, so that we can better understand and ultimately improve the lives of wild animals.

I hope this research will serve as inspiration and a jumping-off point for future research into population-level welfare effects, as well as research into the relationship between population dynamics and wild animal welfare. ■

Luke Hecht and Simon Eckerström Liedholm speak with a WAI grantee in Edinburgh, Scotland.

Read the full Q&A with Simon and find a link to the published paper at wildanimalinitiative.org/2024contraception

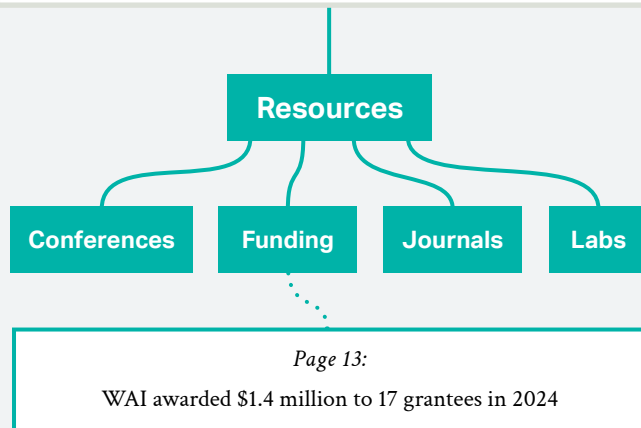
Defining success

RESOURCES

The support systems that make it possible for wild animal welfare scientists to do their work.

Funding, journals, conferences, labs, and other institutions.

Advancing the field



Page 13:

WAI awarded \$1.4 million to 17 grantees in 2024



2024 GRANTEES

We fund academic research on high-priority questions in wild animal welfare.

In 2024, Wild Animal Initiative directed over \$1.4 million to 17 projects across the world. Read on to get a bird's-eye view of our grantees' projects, and click on each project to find full details and abstracts on our website.



Oliver Burman is studying common woodland bird species like the **blackbird** with the goal of developing a cognitive bias test tailored specifically for the study of wild birds.

GRANTEE

Amanda Trask, Institute of Zoology, UK

GRANT

\$199,941

PROJECT

[Parasites in the city: How is the impact of parasites on wild animal welfare affected by urbanization?](#)



GRANTEE

Vivek Nityananda, Newcastle University, UK

GRANT

\$198,748

PROJECT

[Field tests of bee welfare](#)



GRANTEE

Oliver Burman, University of Lincoln, UK

GRANT

\$193,684

PROJECT

[Validating the use of cognitive bias to assess affective valence in wild bird populations](#)



GRANTEE

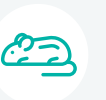
Amanda Koltz, University of Texas at Austin, US

GRANT

\$167,237

PROJECT

[Does diet mediate effects of sublethal parasitic infections on host welfare?](#)



GRANTEES

Vikki Neville & Lisa Leaver, The University of Bristol, UK

GRANT

\$157,049

PROJECT

Developing an automated cognitive bias task for wild squirrels



GRANTEE

Carl Soulsbury, University of Lincoln, UK

GRANT

\$148,741

PROJECT

Are we making urban wildlife sick?



GRANTEES

Lynn Vanhaecke & Alexandre de Carvalho Azevedo, Ghent University, Institute for Research and Innovation in Health, Germany

GRANT

\$49,325

PROJECT

Welfare monitoring 2.0: steroid profiling in wildlife hair



GRANTEE

Thomas Evans, Bristol University, UK

GRANT

\$35,000

PROJECT

Alien species, animal welfare and biodiversity conservation



*Carl Soulsbury's project compares pathogen load and welfare in **red foxes** and Eurasian hedgehogs to determine if urbanization is making animals sicker or more stressed.*



Karli Rice Chudeau is exploring how monitoring and supporting rehabilitated Northern elephant seals and **Pacific harbor seals** like these two can improve their welfare when they are re-released into the wild.

GRANTEE

Ryan Simon Mohammed, Auburn University, US

GRANT

\$30,374

PROJECT

Are populations that are well-adapted to their environment less stressed than those that are not?



GRANTEE

Karli Rice Chudeau, The Marine Mammal Center, US

GRANT

\$30,000

PROJECT

Integrating behavioral competency and post-release support for reintroduced wildlife: a shift in paradigm for rehabilitation and beyond



GRANTEE

Dr. Sarah Richdon, Bristol Zoological Society, UK

GRANT

\$30,000

PROJECT

Improving the welfare of wild and captive animals with integrated in-situ and ex-situ behavioural monitoring



GRANTEE

Maristela Martins de Camargo, Instituto de Ciências Biomédicas, Brazil

GRANT

\$30,000

PROJECT

Field testing a remote, non-invasive method to monitor wild animal welfare through salivary biomarkers



GRANTEE

Andrew Sharo, University of California, Los Angeles, US

GRANT

\$30,000

PROJECT

Comparing the welfare of stocked triploid vs native diploid rainbow trout in California



GRANTEE

Julia Nowack, Liverpool John Moores University, UK

GRANT

\$29,977

PROJECT

The impact of winter food provisioning on the welfare of wild urban hedgehogs



GRANTEE

Marion Chatelain, University of Innsbruck, Austria

GRANT

\$29,943

PROJECT

To feed or not to feed wild birds



GRANTEE

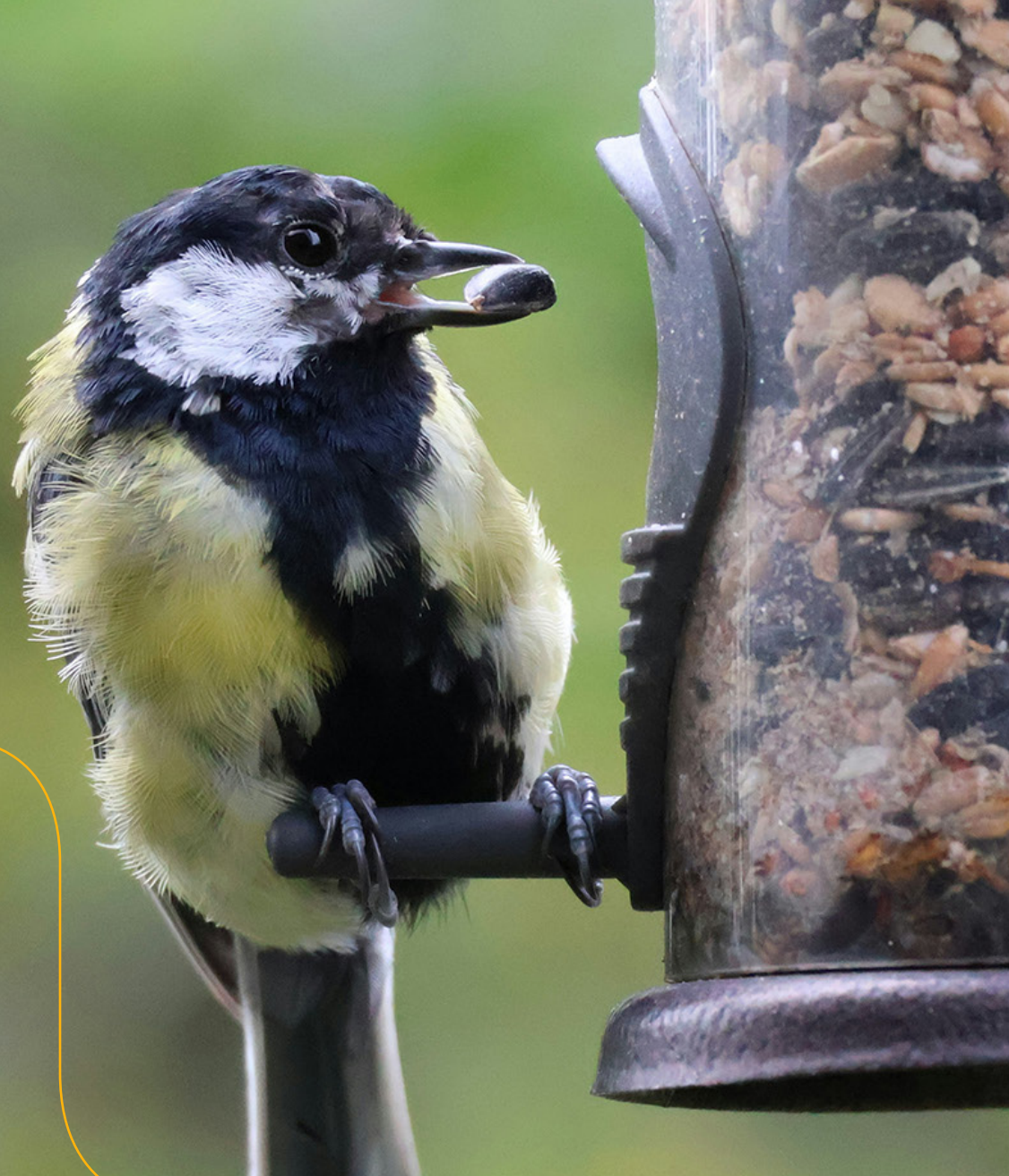
Joachim Frommen, Manchester Metropolitan University, UK

GRANT

\$28,960

PROJECT

How do human activities impair the welfare of highly social fish?



Could bird-feeding do more harm than good? **Marion Chatelain** is studying **great tits** and black redstarts to learn whether bird feeding encourages social stress and competition for nesting sites. ■

Grantee spotlight

RETHINKING PARASITES

Wild Animal Initiative's Seed Grants support early-career researchers in pursuing a long-term research career in wild animal welfare. They fill a funding gap that enables researchers to train and specialize in uniquely welfare-relevant areas.

GRANTEE

Isaac Schuman, Oregon State University, US

GRANT

\$30,000

PROJECT

Integrating nonlethal field and lab assessments of wild fish welfare in the Colorado River in Grand Canyon



Isaac Schuman is a parasite enthusiast.

On the surface, they are studying how parasites impact the welfare of wild fish. But Isaac's interest in wild animal welfare extends to both of the animals that make up the parasite-host relationship. "Most people view parasites purely as diseases, but I have the opposite perspective," they say. Because of the communities and ecological linkages that tie fish and their parasites together, it's hard to think about one without the other.

Isaac pulls in a hoop net to gather fish for data collection.



Photos from top: Isaac's research collaborators wade through the muddy Colorado River collecting fish. Isaac poses with a hoop net.

DIGGING INTO DNA

A PhD student at Oregon State University (OSU), Isaac is part of a multi-lab monitoring project in Grand Canyon National Park. "It's an interesting place because it's very remote, but it's also very anthropogenically impacted," they say. In 1966, a dam was built in the canyon that has had consequences for the fish who call the Colorado River home. The water has become cooler and contains less sediment. At the same time, pathogens and new species have moved in, including parasites. The fish have had to adapt, and one of Isaac's goals is to determine how these changes have impacted their welfare.

The first step is to collect fecal samples from the fish. Later, the DNA from those fecal samples is analyzed in a process known as barcoding — examining sections of DNA and pulling out key information. It's often used to identify species, but it can also tell researchers about the composition of an animal's saliva or feces. Metabarcoding takes this one step further, enabling researchers to examine DNA from multiple organisms at once. It's what Isaac is using to investigate what

information from fecal DNA can tell us about wild fish welfare.

Fecal DNA contents can offer insight into an animal's diet, the bacterial composition of their gut microbiome, and whether they're playing host to any intestinal parasites. In Isaac's research, any correlations between the microbiome, parasite load, and other welfare indicators like body condition and stress hormones can then offer a clue about the welfare of the fish, and how novel environmental factors in the Colorado River might be impacting them.

But naturally, Isaac's particular interest is in the role of parasites: Do some parasites have a more severe impact than others on the welfare of their hosts? What factors lead a parasitic infection to become a major welfare concern?

Some research has already been done on fish parasites in the Grand Canyon, but it has typically involved killing and dissecting fish. Isaac is using more humane



"The first time I went on fieldwork, I noticed that there was so much diversity in the condition and appearance of the fish we were studying, and nobody was really paying attention to that."

Isaac and their collaborators take measurements and collect fecal samples.

Since receiving a grant from Wild Animal Initiative, Isaac has been able to develop a more advanced data collection system that includes a visual checklist for fish's body condition.

COLLECTING THE DATA

A typical day of fieldwork starts at sunrise: After breakfast and coffee, the research group packs up their supplies and heads out to the remote research site by boat. Then they spend most of the day on the water. The OSU labs collaborate with researchers at the United States Geological Survey, and they assist each other with fieldwork for a variety of monitoring projects. The other teams are up first, so there's some water quality and macroinvertebrate monitoring on the way to Isaac's site.

It's not until late afternoon that Isaac sets their hoop nets in the river by their campsite. When the sun sets, the fish move close to shore to feed, and then they encounter the hoop nets. That's when the hard work begins.

"Before bed, everyone else is going to set up their campsites, and we're knee-deep in river water, pulling in hoop nets and hauling buckets of fish," Isaac says.

methods, demonstrating how a wealth of information about community composition and wild animal welfare can be collected in non-lethal ways. The fish are captured in hoop nets so that fecal samples can be taken, but are quickly released unharmed. As Isaac puts it, "we're putting the fish back alive, if a little disgruntled."

But this molecular method isn't just an ethical alternative to dissection; it also has the capacity to capture a greater diversity of data. DNA analysis can pick up on parasitic protists — microscopic animals that dissections miss.

"Just because a parasite is microscopic doesn't mean it can't have a significant welfare impact," Isaac says.

Isaac's focus on individual fish is another way that their work is increasing the depth of knowledge about parasites in the Grand Canyon. Past research has monitored the prevalence of parasites in the population, but not the body conditions of individual host fish.

"The first time I went on fieldwork, I noticed that there was so much diversity in the condition and appearance of the fish we were studying, and nobody was really paying attention to that," Isaac recalls. "We would record the length and weight of the fish, and maybe somebody would note on the sheet that the caudal fin was torn, but there was no systematic assessment."

A NEW DIRECTION IN PARASITE RESEARCH

Isaac's aim is to challenge simplistic assumptions about the relationship between parasites and welfare. Their suspicion is that most parasites have reached something like equilibrium with their hosts — that there may be many cases where parasites like tapeworms or pinworms are acting commensally, even mutualistically, in an ecosystem. "I want to move beyond thinking about parasites as a disease that will necessarily cause illness and negative welfare in an animal," they say. "I'm trying to stay away from preconceived notions about fish with more parasites necessarily being sicker. We don't need to be scared of them and waste management effort on all of them just because they're in the parasite category." This research is crucial to that project: "My hope is that having an additional layer of information about the parasites in this system could help us determine which parasites are worth managing and which aren't."

Working in the welfare space has made Isaac realize that every sentient animal has the capacity for welfare — not just the charismatic ones. Parasite load can tell us something about fish welfare, but what about parasite welfare?

"Most research on parasites is about the population — a big parasite population generally means the host isn't doing too well — but not so much about the individual." Do parasites suffer from overcrowding, or do they like having company in the host animal? Do different host diets impact parasite welfare? "We really don't know," Isaac says.

"How do you even measure the welfare of a parasite?" they wonder. "I'd be really interested in tackling that question someday." ■

Along a shallow creek, the team pauses for a break on their hike to the research site.



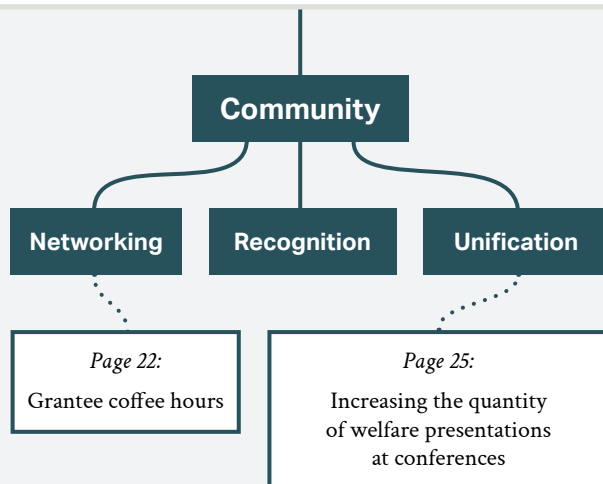
Defining success

COMMUNITY

A sustainable network of researchers that provides support and fosters the exchange of ideas.

Wild animal welfare is a unifying field: It brings together expertise from a range of disciplines, and it achieves success when scientists in other fields recognize the value of its research outputs.

Advancing the field



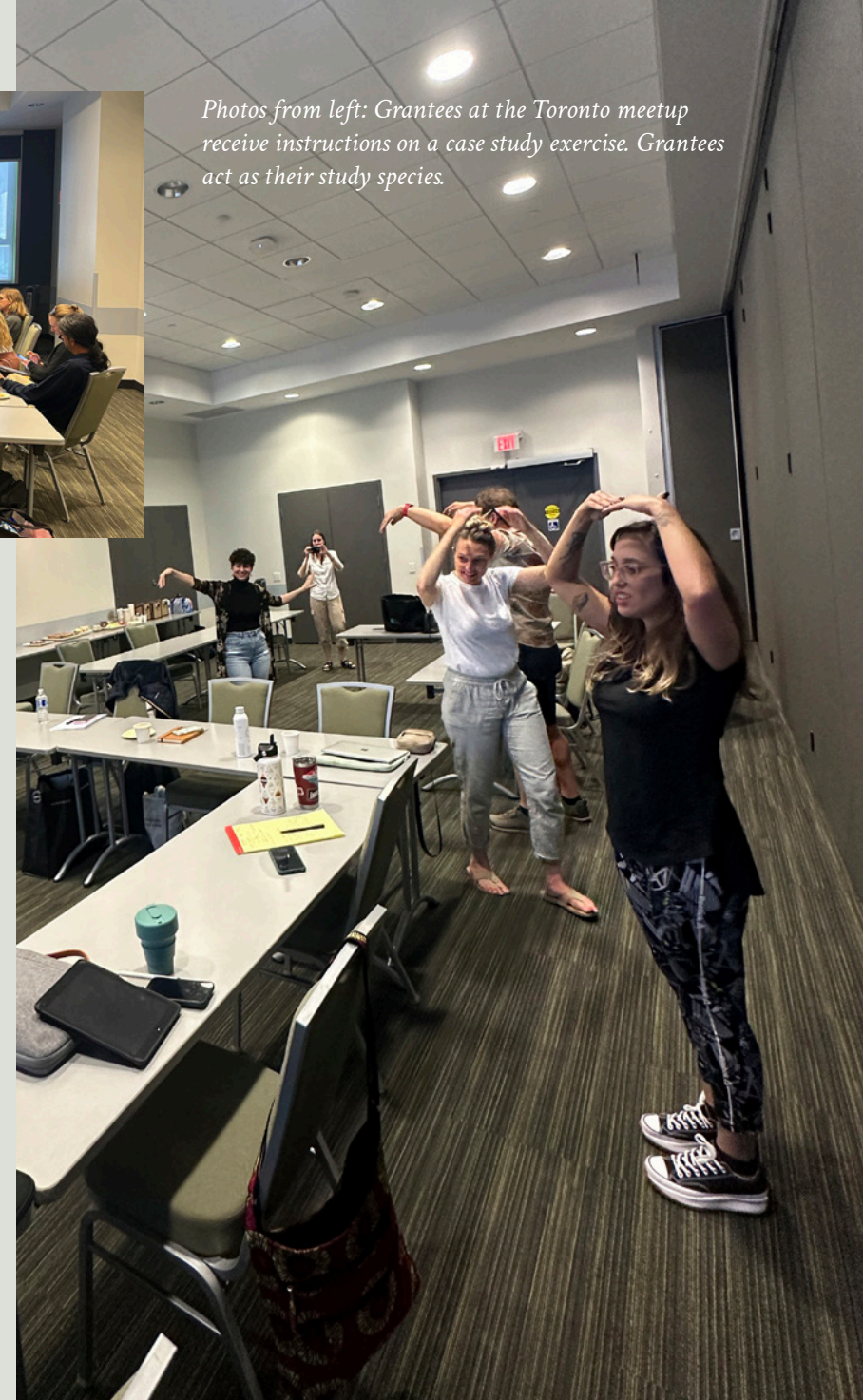


Photos from left: Grantees at the Toronto meetup receive instructions on a case study exercise. Grantees act as their study species.

MAKING CONNECTIONS

To provide opportunities for wild animal welfare researchers to network and build community, this year, we hosted two virtual coffee hours for our grantees, as well as an in-person meetup in Toronto. Of the 68 research teams who have received grants from us, 25 grantees attended the first coffee hour, 18 attended the second coffee hour, and 10 attended the in-person meetup.

Here's what some of them have said about the value of these events.





Photos from left: A screenshot of a virtual grantee coffee hour hosted on Gather. Grantees pose as their study species.



AKSHAY BHARADWAJ

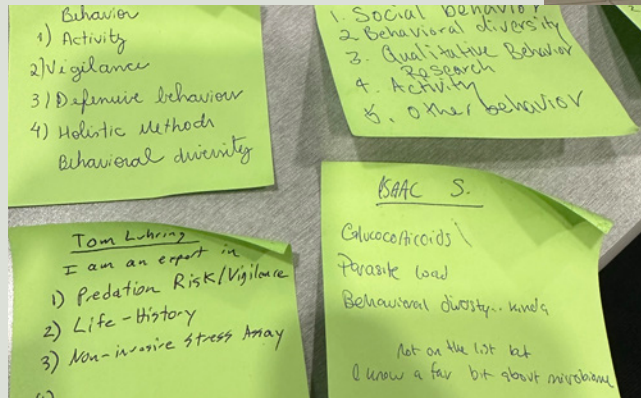
Indian Institute of Science

“The WAI coffee hours brought together a diverse community of wild animal welfare scientists. The breakout rooms based on research interests were **extremely useful for the ideation and development of future projects**. Specifically, my interaction with PIs deploying thermal imaging techniques developed into a follow-up project proposal investigating the mechanistic links between thermal physiology and wild bird welfare. I look forward to contributing to and learning from future WAI coffee hours.”

MEGHAN HOLST

University of California, Davis

“Connecting with fellow WAI grantees in person was invaluable. It offered a unique opportunity to engage deeply with other scientists on integrating animal welfare research into our work. Exploring wild animal welfare alongside like-minded peers gave me a strong sense of community and a supportive network to turn to for resources. **WAI excels at fostering a collaborative environment that not only benefits grantees but also enhances the quality of our science.**”



PAULA SERRES CORRAL

Universitat Autònoma de Barcelona

“Attending the WAI coffee hours has been very valuable, as it has given me the opportunity to network with researchers from different backgrounds. In turn, learning about their projects has been a **great way for me to see other approaches to studying animal welfare outside my field of expertise**. Last but not least, sharing our experiences as WAI grantees has helped create a sense of community within WAI — among grantees, but also with WAI staff — as we have been able to discuss some challenges or issues that we have faced in our research projects, and how we can address them.”

JESSICA X. WRIGHT-LICHTER

Tufts University

“Working with feral pigeons is so absorbing but has also been somewhat isolating, as dedicated research tends to be. The WAI coffee hours provided me the opportunity to see who other scientists in my field are and explore what they’re doing. **Now I have contacts with whom to share and learn from our common experiences**. Just what the doctor-to-be ordered!” ■



Photos from left: Meetup attendees share their areas of expertise on sticky notes. Grantees explain their research projects to other grantees and WAI staff at the Toronto meetup.

Community spotlight

MAKING SPACE FOR WELFARE

Wild Animal Initiative attended 17 scientific conferences in 2024.

What is animal welfare?

- The science that studies the welfare of sentient non-human animals
- Welfare = Physical + Mental
- Mental states
 - Affective state:
 - Negative and positive feelings
 - Welfare experiences over individual's lifetime

Attending academic conferences is one of the most important things we do to foster interest in wild animal welfare science. It allows us to share knowledge with and learn from other researchers, gather feedback, and compare the level of interest in wild animal welfare science among different scientific communities.

These activities are crucial for supporting the growth of the field. For a field to be sustainable and fundable, it needs to provide intellectual value across a number of scientific communities.

It's especially important to connect with researchers in closely related fields like ecology and animal behavior. Much more funding is available for these disciplines than for animal welfare, so getting ecologists and behaviorists to incorporate welfare into their work is a chance to produce research that otherwise might not receive the funding it needs to proceed — as well as to diversify and grow the total number of researchers working on wild animal welfare.

We've attended 43 scientific conferences since our founding in 2019. And in five years, we've seen big changes in how wild animal welfare is represented at conferences — a strong indicator that our strategy is working.

Outreach Manager Janire Castellano Bueno presents at the Animal Behavior Society's 2024 conference in Ontario, Canada.

"I'm really surprised by how much wild animal welfare science has grown among the animal behavior community in the last few years. People are excited when they hear about welfare, and they recognize Wild Animal Initiative."

Janire Castellano Bueno
Wild Animal Initiative Outreach Manager

GALVANIZING GRANTS

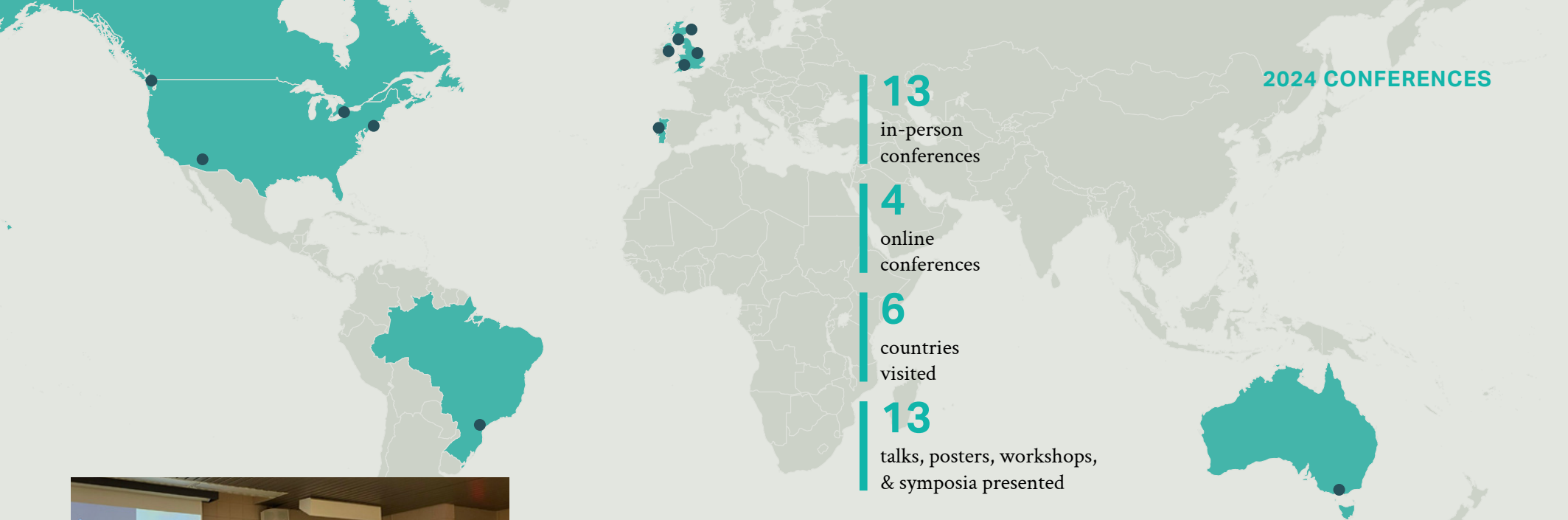
"My biggest fear when we launched our Grants Program in 2021 was that we would spend a lot of money on science that was supposed to be about welfare, but didn't end up being presented that way," says Strategy Director Mal Graham. "Any scientific grantmaker naturally gives up some control. It's an exercise of trust between you and the grantee, and we weren't sure we would get it right. I'm so happy that we now have concrete evidence that we did."

Our grantees are often the ones presenting welfare-centered work at conferences. At the Animal Behavior Society (ABS) conference in June 2024, Wild Animal Initiative led a symposium that dozens of people attended. It was one of two large sessions we ran at ABS 2024, in addition to ABS' first workshop on welfare. Speakers including WAI grantees and other researchers focused explicitly on welfare and its connections to ecology and behavior, showcasing its scientific relevance.

"Presentations like these didn't exist at the Animal Behavior Society conference five years ago," Mal says. "Prior to 2024, only three ABS talks had ever mentioned welfare in their titles or abstracts."



Researcher Bonnie Flint presents at the 57th Congress of the International Society for Applied Ethology (ISAE) in Curitiba, Brazil.



Wild Animal Initiative Outreach Manager Janire Castellano Bueno is joined by panelists at the Animal Behavior Society's 2024 conference in Ontario, Canada.

Wild Animal Initiative Outreach Manager Janire Castellano Bueno says this is indicative of a trend within the animal behavior community: “I’m really surprised by how much wild animal welfare science has grown among the animal behavior community in the last few years. People are excited when they hear about welfare, and they recognize Wild Animal Initiative. There’s more understanding among behaviorists of how their skills can be used to study welfare. All behavior conferences now have some kind of space for it.”

Janire attributes this increasing openness to welfare in large part to Wild Animal Initiative’s grantmaking. “There was no funding body for wild animal welfare before, so there was no space for people to focus on it even if they wanted to,” she says. “Multiple people I’ve connected with at conferences have told me that they wouldn’t have considered submitting a proposal related to wild animal welfare science when they were PhD students because they didn’t think anyone would fund it — it wasn’t viable to try to build a career in it.”

We hope to see other funders follow suit, but for now, our grants are opening up this career path for some researchers.

COMING NEXT

Over the next five years, our priority is to build welfare’s presence in ecology research, where recognition is still lacking. Welfare has long been seen by some ecologists as a hindrance because welfare requirements can place limits on the kind of work they want to do. Helping them see how welfare can be integrated into their studies to better understand ecology could shift this perspective, encouraging them to see welfare as a tool, not a restriction.

“These early steps are all foundational to our long-term goals,” Mal says. “Ultimately, we want to see the work being discussed at conferences informing policy and management, enabling practitioners to implement more welfare-friendly practices.” ■

A CASE STUDY IN COST-EFFECTIVENESS

A government program to vaccinate raccoons against rabies offers a glimpse into what's possible.

What makes early research in wild animal welfare science so exciting — or frustrating, depending on who you ask — is that we don't know exactly where it will lead. We're asking questions precisely because we don't know the answers.

Still, it's reasonable to ask whether this will all be worth it. Wild systems are complicated and, by definition, not entirely under human control. Many present-day efforts to help wild animals — treating severe injuries, for instance — are highly resource intensive and hard to scale. Does that mean wildlife management aimed at improving welfare is hopelessly expensive?

We don't think so, for a few reasons: There are lots of wild animals; humans are already affecting them so much that minor policy changes could have huge effects; the historic neglectedness of this issue means that there are probably some relatively easy wins available; scaling current technologies can bring down costs; and inventing new technologies can open new possibilities.

We think these reasons are compelling, but we also know that they're speculative. To check our rationale against some real-world data, we thought we'd quickly run the numbers on the cost-effectiveness of a wildlife management program that could work as a proxy for the kinds of interventions we'd like to see more of.





RABIES VACCINES FOR WILD MAMMALS

Rabies is a viral disease that is nearly 100% fatal once symptoms appear. For humans and many other mammals it affects, it seems to be among the more painful [causes of death](#), causing progressively intense symptoms over several days, including hyperactivity, violent convulsions, inability to swallow, and partial paralysis.

With the widespread vaccination of people and pets, rabies now resides primarily in wild animal populations. To reduce its prevalence, the [U.S. Department of Agriculture partners with health departments](#) in several states to distribute oral rabies vaccines (ORV) that are safe and effective for various terrestrial mammal species. [Millions of doses are dropped from helicopters](#) into forests and other natural areas each year. Although the program seems primarily motivated by human interests, it also directly benefits the wild animals being vaccinated.

We chose to highlight this example because it has many of the hallmarks of a promising intervention: It targets a source of intense suffering, it can potentially help a large number of animals (i.e., its benefits aren't limited to threatened or endangered species), it can be deployed over large areas with relatively little human labor, and it uses technology that's already affordable enough to be government-funded.

So when we refer to large-scale, cost-effective interventions, this vaccination program is the kind of thing we're thinking of. But we also think it's on the lower end of the cost-effectiveness spectrum for what will ultimately be possible. As wild animal welfare science advances, we expect to find ways to improve cost-effectiveness by several orders of magnitude, including by prioritizing the most tractable issues, designing interventions with wild animal welfare specifically in mind, and refining and scaling technologies and methodologies.



Photos from top: Helicopter in flight during rabies vaccination baiting operations. Oral rabies vaccine baits. Courtesy USDA Wildlife Services.

A BACK-OF-THE-ENVELOPE ESTIMATE OF COST-EFFECTIVENESS

We treated this as a rough thought experiment, not a rigorous research project. We narrowed our scope to raccoons in Texas, and, in order to piece together the little data we could find, we had to make a lot of assumptions. You can see all our calculations, assumptions, and references in this [Guesstimate model](#), but here's an overview of the key points:

We estimate that about 35% of raccoon deaths in Texas were attributable to rabies before the ORV program started in 1995. If Texas had a stable population of 3 million raccoons with an average lifespan of 2.5 years (i.e., 40% of them die each year), then about 420,000 raccoons were dying of rabies in Texas each year.

We couldn't find any data on outcomes specific to Texas, so let's assume the program reduced rabies by 70% by 2021, which is how much rabies declined nationwide during the same period (a conservative estimate, because it includes some areas with ORV programs and many without). That would mean that, by the end of the period between 1995–2021, 294,000 fewer raccoons were dying from rabies in Texas each year. Because this decline was roughly linear, we'll say that the average number of rabies deaths averted per year (RDA/yr) over the period was simply the average of the start point (0 RDA/yr) and the end point (294,000 RDA/yr): 147,000 RDA/yr.

Given that the program costs about \$2.3 million dollars per year, that would mean the average cost of preventing one raccoon from dying of rabies (and suffering greatly along the way) would be \$15.64. Accounting for the asymmetry in our uncertainties bumps the price tag up to around \$20, because there are more ways for this benefit to cost more than there are for it to cost less (see our [model](#), which produces slightly different results each time because it introduces random variation into the calculation).

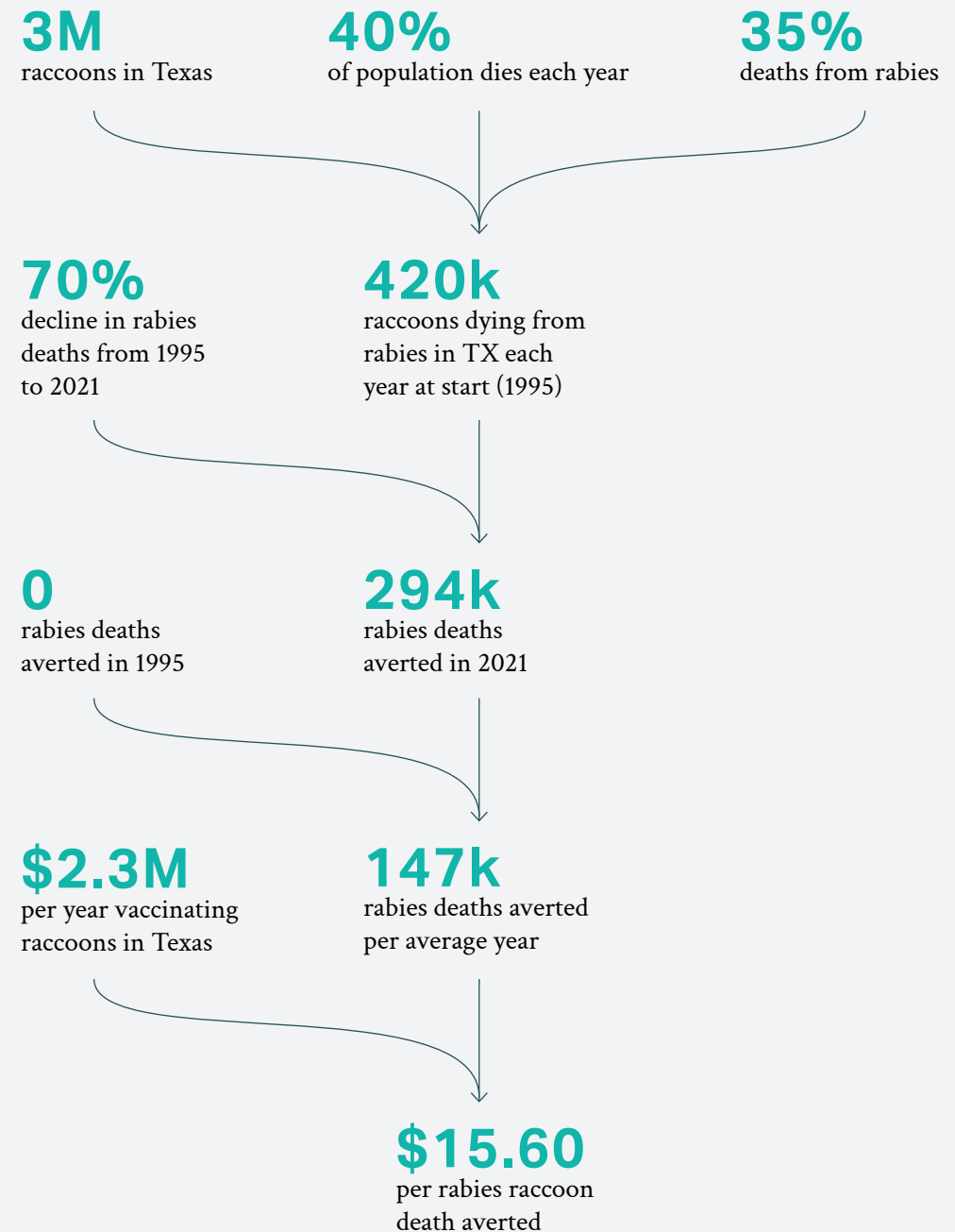


Figure: A simplified graphic model of the calculations in the [Guesstimate model](#).

JUST A STARTING POINT

It's important to stress just how rough that estimate is. Our model is intentionally crude, and the data we put into it left much to be desired. Our estimate could easily be off by a couple orders of magnitude in either direction.

As statisticians love to say: "All models are wrong, but some are useful." The purpose of this model isn't to determine the exact cost of sparing a raccoon from rabies, or to compare ORV against other wild animal welfare interventions — it's to check whether it's reasonably possible that wild animal welfare science could lead to the development of highly cost-effective interventions. Whatever the true value of ORV programs is today, we should expect it to be on the low end of what could be accomplished in the future. Research can identify more promising targets, find points of higher leverage, improve the effectiveness of technology, and reveal ways to lower the costs of production. If nothing else, interventions are likely to be much more effective at helping wild animals if they are designed specifically for that purpose, as opposed to incidentally benefiting animals insofar as it advances human health and economic priorities.

This is why we think that supporting the growing field of wild animal welfare science is a critical step to unlocking more ways to help wild animals.

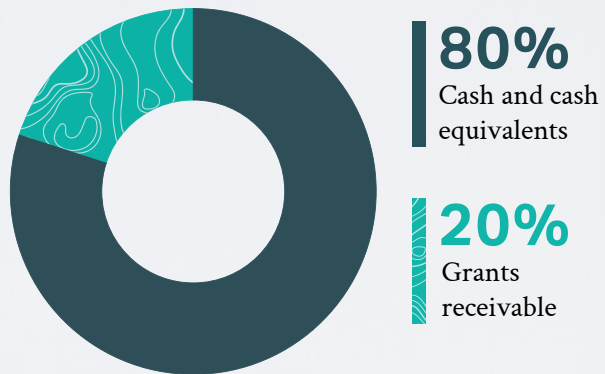
Actually doing the necessary research — and investing in the people and institutions who can sustain knowledge production — will not be as immediately rewarding as dumping vaccine pellets out of helicopters. But we think it will pay off in the long run, given how effective existing programs might be and how much room they have to improve. ■



FINANCIAL SUMMARY

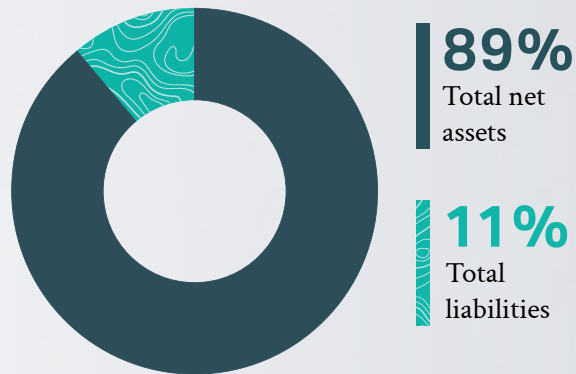
CURRENT ASSETS

\$7.6 million



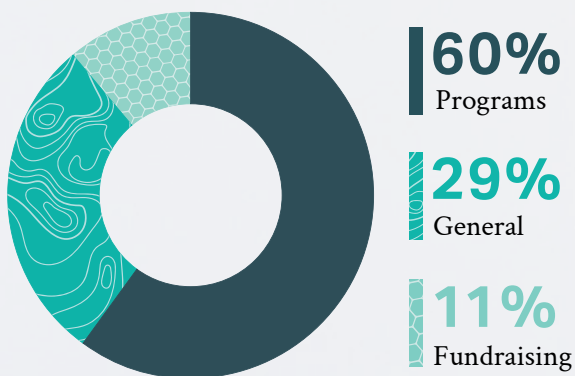
LIABILITIES AND NET ASSETS

\$8.6 million



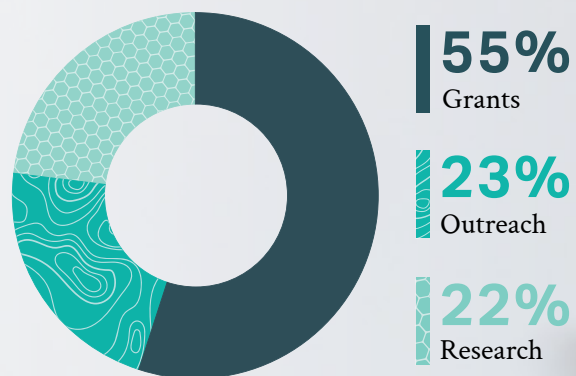
FUNCTIONAL EXPENSES

\$3.4 million



PROGRAM EXPENSES

\$2 million



**Please note that these figures are in draft form and will be updated once audited figures are available.*



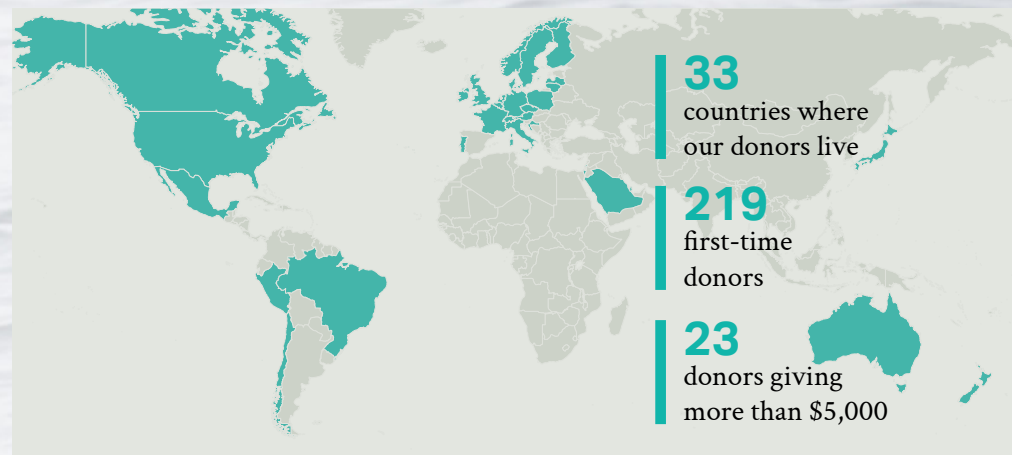
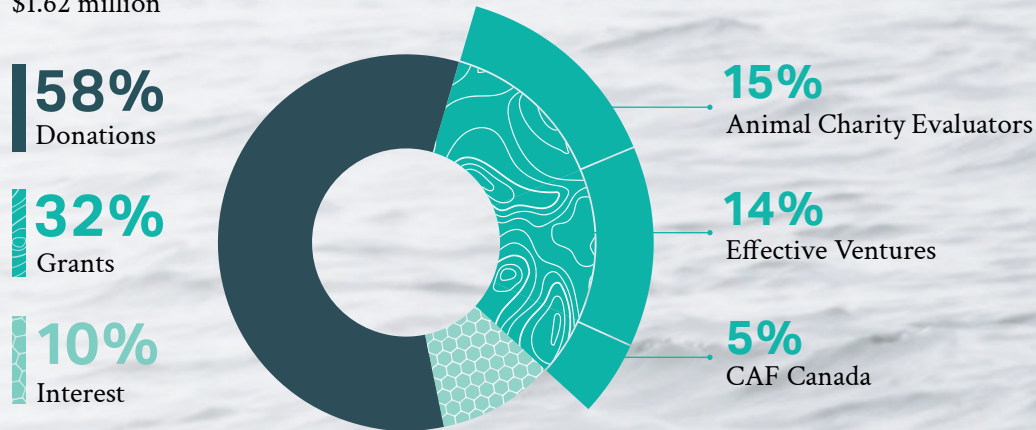
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As a nonprofit, we rely on the generous contributions of individual donors and grantors who help make our work possible.

We're grateful to all who support our mission to accelerate science that helps wild animals.

UNRESTRICTED SUPPORT & INTEREST

\$1.62 million



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Wild Animal Initiative staff during the 2024 retreat in Seattle, Washington.

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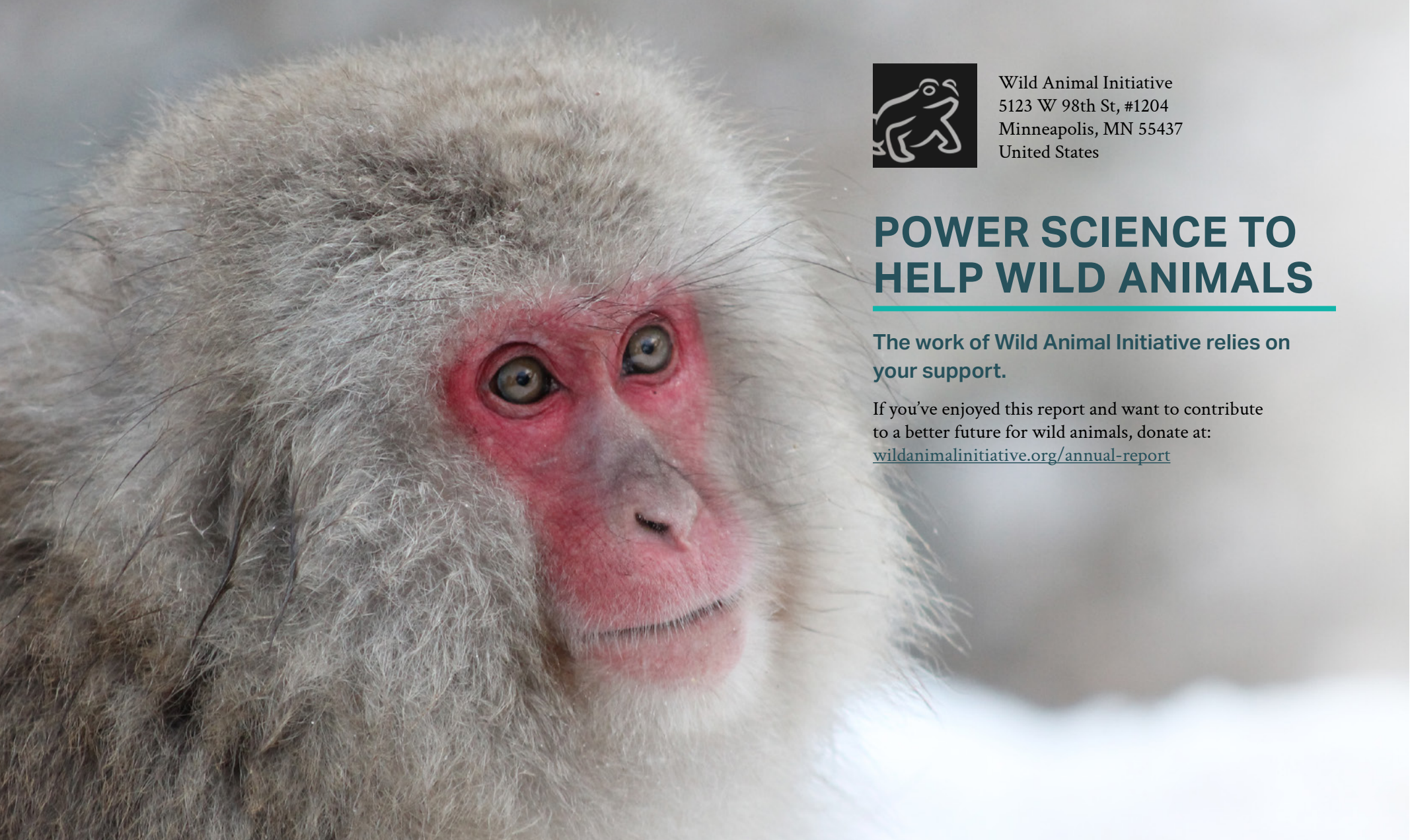
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 These staff members also contributed original photography for the 2024 annual report. Their photos of wild animals and WAI events are included throughout.



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