



2017 ANNUAL REPORT



“I am so grateful for the opportunity to make even a small difference in the fight against extinction.”

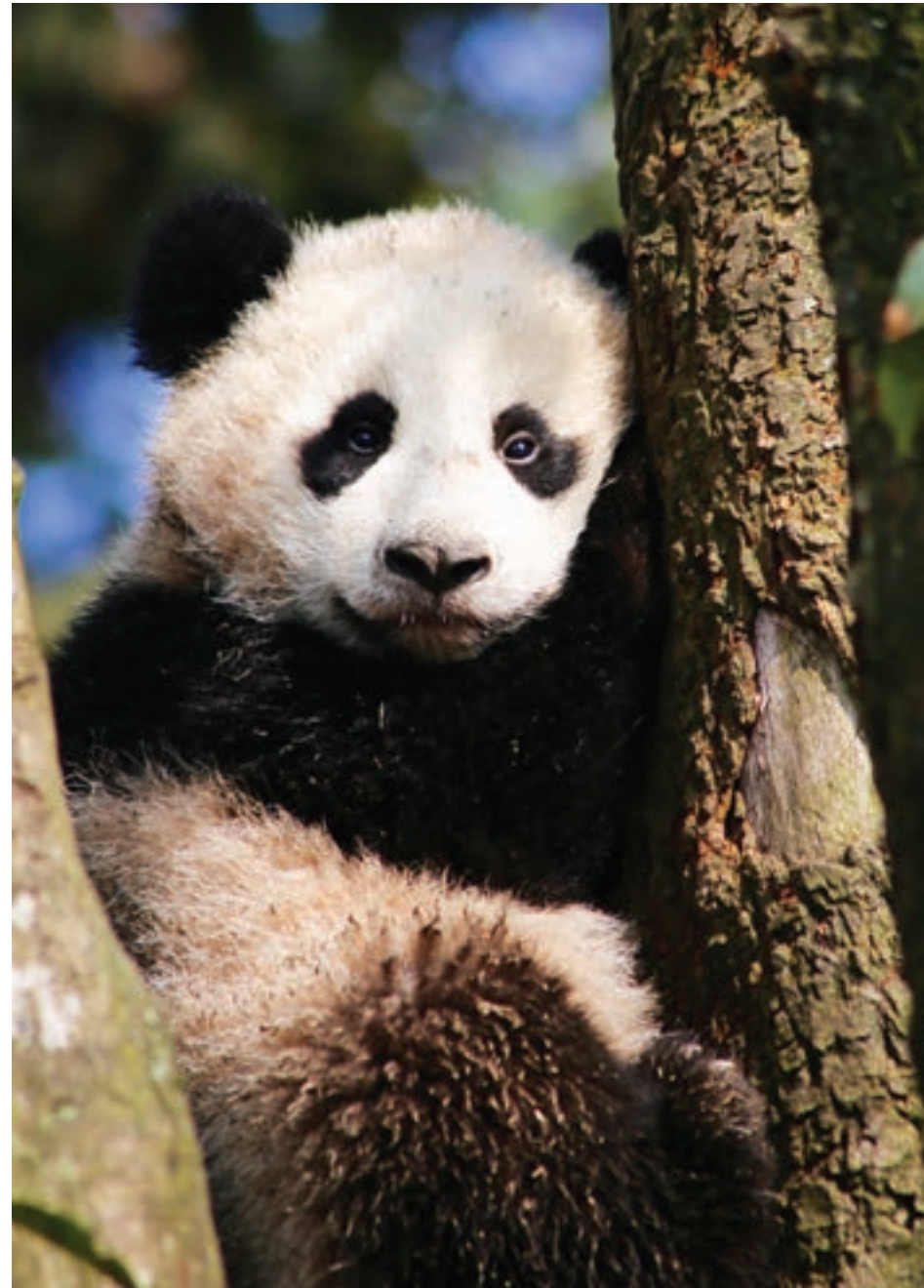
— Meghan S. Martin-Wintle —

Dear Panda Fans,

One of our recent interns at Bifengxia Kate Van Raden, just WeChatted me, “I’m going to be so sad to leave! Thank you for creating this opportunity for us, and in particular, for me.” As the 2017 year comes to a close and I look back at all the wonderful interns we’ve helped build into awesome scientists, I can’t help but feel overwhelmingly thankful for the wonderful supporters we’ve amassed! You have changed our families lives as well as our little non-profit and, in turn, all the lives PDXWildlife touches; from our interns, to the giant panda mothers and their cubs, to the new endangered species we’re expanding to work with. You all have made SUCH an impact!

One of our proudest moments was seeing the giant panda downlisted from “endangered” to “vulnerable”! A goal that we contributed to by increasing captive breeding reproductive success. This year 42 cubs were born at Bifengxia, the highest number ever born and capping a steady increase over the past three years since PDXWildlife’s research has been implemented in the breeding program. We also expanded our research into another giant panda breeding facility, Gengda, and started to help with the reintroduction program there – both moves that we hope will see additional increases in the wild panda population and another downlisting in the next 5 years. Instead of our normal 11 interns, your donations allowed Nate to expand his role and bring another 7 interns into China and conservation biology research! Additionally, we recently applied our techniques to an endangered Hawaiian bird, the ‘Akikiki, which only has 450 known individuals in the wild. We have accomplished this and so much more which I hope you’ll see in this report.

In writing these 2017 major accomplishments, I realized how much of an impact





your gifts had on our work and mission! But there's more to be done! Salaries are one of the most crucial, yet one of the most difficult items to fund in conservation biology non-profits. While many people believe wholeheartedly in our work, they are reluctant to fund the people necessary to conduct that work. This is why every gift means so much – dedicated funding to our scientist's salaries and specific projects has increased our capacity and enabled us to accomplish projects we have been dreaming about for years! It means the world, and literal lives, to the wildlife we work with.

As we move into the new year, I'm excited to take advantage of the momentum we've built in 2017 to move our mission forward through creating innovative solutions for conservation science. Halting extinction and reversing the world's declining wildlife populations is my life goal but cannot be accomplished alone. Preserving wildlife for our children and grandchildren will truly take a "global village" and I am so happy that the our supporters have become part of that family. We hope that you continue to help fight wildlife extinction with us in 2018!

Thank you so much for your support we couldn't do it without all of you!

Happy Holidays!

Meg & Nate

GIFT DETAILS

Name of Organization: PDXWildlife
Mailing Address: 9233 SW Brier Pl.
Portland, OR 97219
Telephone Number: (503) 841-7036

Name of Contact: Nathan J.P. Wintle
Title: Deputy Director
Email: nate@pdxwildlife.com
Donation Description: Salary for Nathan Wintle

Donation Dates: Dec. 1st, 2016 to Nov. 30th, 2017
Reporting Period: Dec. 1st, 2016 to Nov. 30th, 2017
Donation Amount: \$50,000
Amount Used: \$50,000

RESEARCH





2017 BABY BOOM

As I head to the breeding center with my four interns in tow, I can't help but think of what a formidable presence we are; five highly trained scientists out to collect data that will make a real difference in the number of endangered giant pandas born this year. We grab our cameras and our iPads loaded with a behavioral scoring app and head to the elevated walkways surrounding the breeding pens to get a better view.

The male pandas are pacing restlessly along the shared barrier with the female who is in estrus . . . or rather one of the males is pacing and the other is contentedly eating bamboo, seemingly oblivious to the breeding opportunity right next door. Our research for the day is focused on figuring out why certain males seem motivated to mate while others express no interest – a project we've lovingly dubbed "male-male competition" (i.e. searching for the Don Juan of pandas).

Poorly motivated males are the "weak link" and often blamed for captive breeding

failures. The wild mating system is in stark contrast to current captive breeding methods. In the wild, rival males will compete to establish dominance for an estrous female, with the winner securing breeding rights. In captivity, males have no male-male competition and are actively managed to avoid any kind of male-male interaction. Understanding

"The birth rate is currently higher than at any time since the breeding program began."

– Zhang Gui Quan –

how giant pandas perceive and respond to male-male competition during the breeding season may be critical to increasing reproductive success, particularly in animals that may be underrepresented in the gene pool.

It is no coincidence that the CCRCGP at Bifengxia increased its breeding success after it started implementing PDXWildlife's ground breaking findings^{1,2,3} on mate choice in the 2015, 2016, and 2017 breeding seasons. Our research has led to a panda baby boom in China. This year alone 42 cubs were born, topping off record breaking years for the last three years straight. Now that both male and female adult giant pandas are given a choice we have seen breeding success skyrocket with almost every female successfully breeding with a male and producing a cub.

PDXWildlife's team of scientist and the internships have directly contributed to increasing the captive giant panda population which has helped it reach sustainable levels, thus making it resistant to extinction. Surplus cubs from the captive breeding program will now be used to supplement and bolster the wild population. PDXWildlife is building on this success and focusing on the male giant pandas. Once we start incorporating male-male competition into the breeding program, we hope to see even greater increases in breeding success!



Meghan S. Martin-Wintle, Director

References

1. **Martin-Wintle, Meghan S.**, et al. "Free mate choice enhances conservation breeding in the endangered giant panda." *Nature communications*, 6 (2015): 10125.
2. **Martin-Wintle, Meghan S.**, et al. "Do opposites attract? Effects of personality matching in breeding pairs of captive giant pandas on reproductive success." *Biological Conservation*, 207 (2017): 27-37.
3. Li, D., **Wintle, N. J.**, Zhang, G., Wang, C., Luo, B., **Martin-Wintle, M. S.**, ... & Swaisgood, R. R. (2017). Analyzing the past to understand the future: Natural mating yields better reproductive rates than artificial insemination in the giant panda. *Biological Conservation*, 216, 10-17.

Accomplishments

- Giant panda downlisted from "Endangered" to "Vulnerable"
- Increased breeding success from 23% to 90% through implementing mate choice and personality studies.^{1,2}
- Produced 42 baby cubs in 2017, up from 23 in 2016 — an 82% increase!
- Published "Do opposites attract? Effects of personality matching in breeding pairs of captive giant pandas on reproductive success." in *Biological Conservation*.
- Published "Analyzing the past to understand the future: Natural mating yields better reproductive rates than artificial insemination in the giant panda" in *Biological Conservation*.

“While conducting the maternal care observations, I have discovered primarily, that panda moms are super variable in their maternal care behaviors. While some moms are very attentive, and seem to devote most of their energy to child care...other moms seem very relaxed about the wellbeing of their little one, and focus more time on eating and sleeping (cuddling often included). There is very little stereotypical behavior observed during the first few months of a cub’s life. Even the relaxed mamas have their hands full during this time with feeding, cleaning and admiring their newest addition. It isn’t until the infant approaches the three or four month mark, that some panda moms begin reverting to old habits. At this point, it becomes more common to see mom displaying some stereotypical behaviors while her cub is working hard to become independence.”

– Katelin Van Raden –





“For the Maternal Care study, I spend my mornings watching mother-infant interactions. Recording both the mother and cub’s behaviors, we are able to study her attentiveness, quality of care, and most common interactions. The results of the study should be very interesting: Will mothers interact with each cub differently? Will she spend more time in contact (cradling, nursing, licking, etc.) with one twin versus the other? What are the factors that affect her choice (size, strength, sex)? Do mothers develop strategies for raising more than one cub at a time? Will experienced mothers be more or less attentive, and which of her behaviors carry from one birthing season to the next?”

– Katherine Brantley –

EDUCATION





TRAINING THE FUTURE

Although our job is awesome, there are certainly less glamorous parts to it. For example, standing nearly still in the cold for up to over an hour and a half, going to collect fecal samples from bears all over the base, and then crushing said fecal samples down to a powder to lyophilize them. For those who are less than enthusiastic about the idea of picking up panda poop, I assure you, we do it for a good reason. In order to see if the male's testosterone levels go up during the breeding season, and, in turn, affect their reproductive success. We collect fecal samples for the better part of every year.

Once the samples are collected, they are ready to be prepared for freeze-drying – a process that involves using a rubber mallet to reduce the original samples to a manageable size. Then the samples are placed on a two-tiered tray in the lyophilizer for three days to freeze dry. Upon finishing this process, they will be crushed and strained into a fine powder and stored in a 20-degree freezer until they are ready to be sent to Dujiangyan base for hormone testing. While these three sentences sum up the process, in actuality our interns go through an

intensive 3-week training program at the beginning of their internships that prepares them for our research and as future conservation biologists.

Even though PDXWildlife originally set out to primarily conduct research, we quickly realized the importance of offering hands-on training that gives rise to future scientists. When we prepare to welcome a new group into China, our suitcases bring much more than clothing and foodstuffs (Spicy Cheetos and cheese being among the most coveted items), they also bring the hopes and aspirations of future leaders in conservation biology. Hopes that can be crushed or nourished by the experiences they have in China.

When we first began conducting research in China in 2010, we had a single intern and a single research project. Fast forward to the present, we will train 24 interns per year starting in 2018 on six highly specialized projects – ranging from mating and personality behavioral data collection to endocrinology and fecal hormone analysis. In short, Meghan and I are very proud to have made such an impact on such a diverse “family” of interns who have now moved on to careers of their own.

We've also started capacity building for the Chinese scientists we



work with as well to train their next generation at the CCRCGP. As deputy director of PDXWildlife, I attended two capacity building workshops to assist Dr. David Kersey in training CCRCGP employees on hormone project design and fecal analysis. Meghan and I helped the CCRCGP enter the 21st century by providing workshops for CCRCGP employees on behavioral data collection using iPad technology, training on camera trap set up, and statistical analysis in R.

We have also extended our collaborations to Scotland and London. Through a signed contract with Edinburgh University and Edinburgh Zoo collaborating with professor Alex Weiss and Iain Valentine from the RZSS to start work on the genetic basis of personality and potential for domestication effects in the conservation breeding program for the giant panda. Additionally, we started collaborations with Maria Diez-Leon of the University of London's Royal Veterinary College on the effects of aggression in captive breeding programs. Both of these collaborations will involve sponsoring and co-advising graduate students from their respective universities. We know this capacity building work will only make our research better and more efficient.

Not to mention, we're very excited to see what the future holds!



– Nathan J.P. Wintle –

Accomplishments

- 18 interns trained in 2017.
- One masters student from Edinburgh University, Jonathan Thames, hosted and co-advised at Bifengxia.
- Signed collaborative contract with Edinburgh University and Edinburgh Zoo to perform research on genetics and domestication in the giant panda.
- Started collaboration with Maria Diez-Leon from the University of London on the effects of aggression in captive breeding programs.
- Attended and presented “San Diego Zoo and PDXWildlife current and future research projects to advance giant panda conservation” at the Species Survival Plan Meeting for the Giant Panda, Toronto, Canada.
- Published “Natural mating yields better reproductive rates than artificial insemination in the giant panda” in *Biological Conservation*.





“Currently, our main base of operations is at Bifengxia where we have four interns conducting various studies on a year-round basis. Just this year we expanded to include reintroduction research at Hetaoping and Gengda, with two interns rotating in every few months.

However, there is a shift currently taking place that could possibly cause us to move our operations almost entirely to the ever-so-quiet Gengda. This all depends on where the bears are going to be.”

– Nathan J.P. Wintle –

“Even though I have changed from terrestrial to marine mammals, the research methodologies, techniques, and lessons are very transferable. The skills I learnt from my internship with PDXWildlife are ones I still use today. I couldn’t be more grateful for my time at PDXWildlife. I have such great memories from my time in China — ones I will share with anyone willing to listen!”

– Grace Russell –



REINTRODUCTION





REWILDING GIANT PANDAS

I breathe in the cool mountain air. We've been struggling up the steep hills of Tiantaishan for the last hour looking for a perfect location for our camera traps. I peer through the bamboo stands straining to see a moving black and white form, a shadowy outline moving through the dense vegetation. I strain my neck and stand on my tippy-toes . . . and . . . there it is! I get a good glimpse of the giant panda, not exactly in the wild, but in a very large enclosure meant to prepare it for life in the wild. I am here at the Tiantaishan reintroduction center with my new part-time employee, Zachary David (a previous PDXWildlife intern) and an incoming intern, Nicki Gordon.

The idea of the Tiantaishan pens is to bring a mother with a very young cub to these large, naturalistic enclosures that are not too disparate from what pandas would experience in their wild habitat. After this training experience, the cub will be released into the mountains of neighboring regions in China to bolster wild panda populations and increase genetic diversity. PDXWildlife is working closely with the CCRCGP and San Diego Zoo to develop this training program.

With San Diego Zoo's financial support for my postdoctoral fellowship, I will be doing a series of studies designed to learn what pandas need to know for life in the wild and how we can promote some of these essential behaviors in captivity. We have brainstormed a number of ideas. One is to look at bamboo feeding. On the surface, it might seem quite simple, but for an animal that spends 14 hours a day eating just to get enough nutrition, a panda must be an efficient eater. They have to willingly eat many different species of bamboo and locate the most nutritious stands.

But pandas must do much more than just eat to survive and thrive in the wild. They must also know how to avoid becoming prey and interact with other pandas. A released panda must know how to integrate into a social network. Although predominantly solitary, pandas are not asocial. They must learn how to communicate with one another, when to approach and when to avoid, how to court and mate, and, especially for males, how to compete with one another. Male-male competition can be dangerous and deadly. So we will also be measuring these

pandas' social competence and developing ways to encourage it.

As we catch a glimpse of the mother panda heading back into the forest to be with her cub, I think how lucky I am to be here and to have this opportunity. How lucky I am to be at the forefront of the “next step” in giant panda conservation work.

Since we have helped produce these cubs during the breeding season, I am deeply connected to each one and care what happens to them next. I want to make sure they make meaningful contributions to the species' conservation, while having the smoothest transition possible into the wild.

Although pandas have reached a major milestone recently by being downlisted from endangered to vulnerable, it is time now for us to roll up our sleeves and get on with the continued work necessary to keep them on the path to recovery. While experiencing these soon-to-be-wild pandas at Tiantaishan has been a real treat, I do hope that one day I will catch a fleeting glimpse of a wild panda that got its start at the breeding center.



Meghan S. Martin-Wintle



Accomplishments

- Completed eight behavioral competency tests on three mother-cub pairs at Tiantaishan and Hetaoping, two of which will be released into the wild November, 28th 2017.
- Trained two reintroduction interns and set up apartments to house four reintroduction interns a year.
- Expanded collaborations at Hetaoping and Shenshuping by signing a contract on future weaning and reintroduction studies.
- Held a capacity building one-day workshop for Tiantaishan and Hetaoping researchers in “Beginning Statistical Analysis in R”.
- Submitted “Evaluating individuals for reintroduction suitability: a case study in feeding behaviors of captive-born and wild-born giant pandas” to Animal Conservation.



“With a cool breeze hitting our faces early in the morning, the CCRCGP delegate pointed towards a break between the mountains about 1000 vertical feet up. The extra body weight that I decided to put on was yelling at me to turn around, but the opportunity to see and study potential reintroduction pandas kept me climbing. As Zack seemed perfectly at peace with the constant outpouring of sweat, I methodically labored a 30lb. pack full of camera traps to the first locked gate.”

– Nathan J.P. Wintle –



“It has been quite a month in Gengda so far! Between working with reintroduction candidates in both Hetaoping and Tiantaishan, we are kept very busy. In each of the reintroduction enclosures, we have been placing four camera traps in a circle around a certain conspecific scent, urine sample, or novel object (such as jeans with human scent). These cameras are designed to capture video of whatever moves in front of them in three minute intervals.”

– Zachary David –



THE FUTURE



MEASURING THE IMPACTS OF CLIMATE CHANGE

It's no secret humans are causing drastic shifts to our climate.

PDXWildlife started noticing a shift in the breeding season in 2014 and saw a drastic shift last year in 2017. The winter was warmer, we had to wear less clothes to stay warm during our research and breeding lasted from December to June (normally from February to mid-May)! Good thing we collected environmental data during our research seasons since 2012! Now we're able to take a retrospective look at our data and see why pandas may be breeding so much earlier!

Future plans

- Publish "Shifting Temperatures = Shifting Breeding Seasons: How climate change has changed the giant pandas".

"An interesting aspect of conducting year-round research at Bifengxia is that we get to observe panda behaviors every season, which allows us to detect seasonal changes."

– Nathan J.P. Wintle –

ANTHROPOGENIC POLLUTION AND WILDLIFE

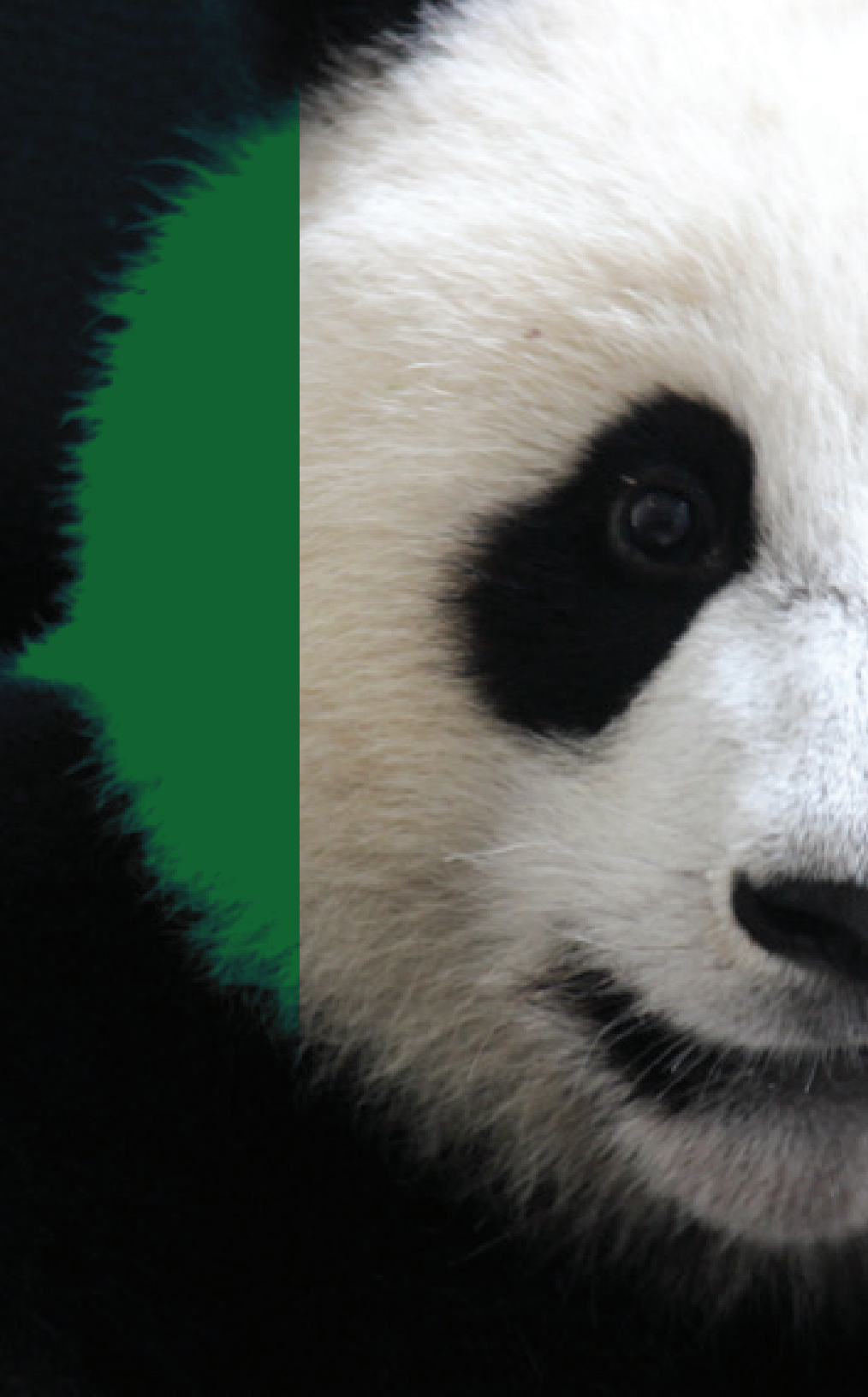
Humans are a source of various pollutants that can make their way into an animal's system and China is known for its coal plants which pollute the atmosphere. To make sure none of these pollutants are making their way into and harming the giant panda, PDXWildlife has initiated the first ever research into the overall mercury and lead body burdens in giant pandas. We plan to investigate mercury concentrations along a rural to urban gradient.

Accomplishments & future plans

- Submitted journal article: **Nathan J.P. Wintle, Meghan S. Martin-Wintle**, Hemin Zhang, Xiaoping Zhou. Blood lead levels in captive giant pandas. In review.
- Finished data collection on mercury loads in wild pandas from Beijing, Dujiangyan, Bifengxia, Hetaoping, and the wildBeijing, Dujiangyan, Bifengxia, Hetaoping, and the wild.



“I’m really excited to connect the dots in terms of discovering a potential “mercury gradient” among the different locations. As human beings are a major factor in global mercury contamination, the hypothesis is that pandas from an area with a low population (wild) will have a lower amount of mercury than bears from an area with a high population (Beijing).” – Nathan J.P. Wintle –



FIGHTING EXTINCTION

It's 5a.m., the morning is misty with the promise of a beautiful sun-filled day in the purples and pinks of the sunrise and the sky is filled with the distinctive calls of the 'Alala and 'Akikiki resounding through the Hawaiian landscape at the Keauhou Bird Conservation Center. It turns out the little Hawaiian forest birds get an early start on their courtship and breeding behavior which means, we as scientists studying this behavior, must also get an early start!

I've been invited, as an expert in captive breeding, to evaluate the current breeding methods and design an experiment that will help test how to improve the 'Akikiki's (and eventually the 'Alala) breeding success. The work starts with intensive interviews of the team and keepers to get a feel for historic problems with pairings and behavioral observations of the birds. Talks quickly develop into full-blown brainstorming sessions on an experimental design.

PDXWildlife's experience on giant pandas has prepared us to evaluate and improve other endangered species programs — quickly and efficiently. The intensive work we've devoted to protocol design, troubleshooting facility limitations, and writing protocols uniquely prepares us to consult on other conservation breeding programs.

There is great debate over whether these types of programs should be continued. Are these captive breeding programs a good or a bad thing? I believe as humans continue to endanger wildlife populations (we've now entered what scientists are coining the *6th Mass Extinction* or the *Anthropocene Extinction*) it is important to have some individuals of a species still existing somewhere rather than go extinct completely. While we should continue to support the wild populations as they are, conservation breeding techniques exist as another tool in our toolbox and can help to keep endangered species viable instead of risk complete extinction.

My hope is that PDXWildlife can help conservation programs become more efficient and successful in less time than it would take starting from scratch, thus, saving more species from extinction. I hope that as we build this "family" of donors, interns, and staff we build a family that is devoted to and passionate about preserving wildlife for future generations. I hope that through the giant pandas we've helped breed, interns we've trained, research we've performed, and our future conservation work that we will leave the world a little better than when we arrived. I am so grateful for the opportunity to make even a small difference in the fight against extinction.

Accomplishments

- Developed first behavioral ethogram for 'Akikiki mating and courtship behavior.
- Developed and implemented mate choice experiments on 'Akikiki
- Trained eight staff members at the Keauhou and Maui Bird Conservation Center in ethogram and experimental design
- Started collaboration with Keauhou and Maui Bird Conservation Center on future 'Alala mate choice and breeding research
- Invited speaker at Behaviour 2017 for symposium on "Animal Welfare and Conservation Breeding: Synergies and Challenges". Presented on "The Giant Panda and the Columbia Basin pygmy rabbit: Two case studies on the welfare and reproductive benefits of mate choice in conservation breeding programs", Lisbon, Portugal.
- Published "Variation in Reproductive Success Across Captive Populations: Methodological Differences, Potential Biases and Opportunities." in *Ethology* 123(1). 1-29.
- Submitted "Improving the sustainability of captive populations with free mate choice" to *Zoo Biology*.



“Our research has the potential to directly bolster the in-situ giant panda population through increasing the genetic diversity and number of individuals produced in captivity that are available for the reintroduction program.”

— Meghan S. Martin-Wintle —





“My devotion and love conserving endangered species has always been my most precious resource. It gives me the strength to face the tough challenges required everyday by conservation biologists who devote their lives to fighting devastating species loss and population declines in our beloved wildlife.”

— Meghan S. Martin-Wintle —



Your Gift Makes a Difference

Maybe you've already decided to join our panda family and become part of a larger movement that is helping fight extinction and preserve wildlife for future generations. If so, I want to thank you again for your support of our mission at PDXWildlife. As you can see your donations helped fund our research and salaries which contributed to our current programs, intern training, and expansion into new projects and ideas! We hope that, just like us, you want to celebrate another anniversary next December through continuing your support with a donation or even increasing your support to the next level.

If you haven't committed to supporting our research we hope that you consider starting today! With an increased donation revenue PDXWildlife could expand our research projects and hire a Research Technician to work year-round on data entry and data collection. Staff salaries in conservation biology are sorely underfunded. Your help changing this trend would increase the number of conservationists that positively impact wildlife populations! Hiring a Research Technician would enable us to increase publication rates and disseminate our research to other endangered species programs that need our help.

Do not doubt for one second that your support has directly impacted extinction by helping improve conservation-breeding programs! We hope you'll continue to help us fight against declining wildlife populations.

Thanks for all your support and for just being awesome all around!

Love,

Meg & Nate



2016 Revenue- \$140,994

2016 Expenses- \$97,634

2017 Revenue- \$136,027

2017 Expenses- \$171,825

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