



Panthera

2022 Annual Report

Panthera's mission is to ensure a future for wild cats and the vast landscapes on which they depend.

Our vision is a world where wild cats thrive in healthy, natural and developed landscapes that sustain people and biodiversity.

Cover: Panthera biologist Raíssa Sepulveda tracks ocelots using telemetry in the Brazilian Pantanal.

Panthera

2022 Annual Report

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Wild Cats and Indigenous Ties

A COLLABORATIVE APPROACH TO CONSERVATION

I am fortunate to have the opportunity to explore numerous global wild cat habitats and engage with dozens of Indigenous communities who live alongside these felines. Throughout my travels, a striking commonality stands out: a deep connection between humans and wild cats that transcends mere physical proximity. For these Indigenous communities, wild cats are part of their identity, their culture, their collective psyche and their ancestral history. Big cats, in particular, command a remarkable reverence, an instinctive respect I've witnessed in countless Indigenous societies. Regardless of species or geography, a vibrant cultural kinship with these big cats flourishes.

Recognizing this profound connection, our dedicated team of scientists strives to understand the threats facing wild cats from multiple perspectives. Whether grappling with habitat fragmentation, human-cat conflicts, poaching or a myriad of other pressing issues, we first develop a robust understanding of the issues, then formulate the most impactful solution.

A testament to this approach is the expansion of our collaboration with the two Orang Asli Indigenous sub-ethnic

groups — the Bateq and Semaq Beri — residing in the heart of Peninsular Malaysia's Greater Taman Negara Rainforest, the home of the Critically Endangered Malayan tiger.

I won't mince words: reality for communities living in close proximity to these big cats comes with unique challenges. Livestock predation, competition for prey and, albeit infrequently, big cat attacks on humans have created a complex relationship. Despite those very real challenges, these communities recognize what is at stake: Malayan tigers may altogether cease to exist, forever altering the species' critical impact on ecosystem protection — including air, water and food sources. In response, these communities are resolute in their determination to safeguard the Malayan tiger, adopting a pragmatic approach. The bond that these communities share with the tigers surpasses mere coexistence — they represent a formidable frontline in protecting Malaysian wildlife and forests against poaching threats.

For almost a decade, these communities have leveraged their familiarity with the forest and its wildlife in their work as forest

rangers and active participants in protected area management. They are model custodians for Malaysian wildlife. In partnership with the Department of Wildlife and National Parks (DWNP) Malaysia, Panthera is facilitating the development and professionalization of counter-poaching skills amongst the Orang Asli rangers.

Our extensive understanding of wild cats and their connection to communities like the Orang Asli plays a crucial role in informing our policy advocacy initiatives across the globe. Last year, Panthera joined forces with tiger experts from leading NGOs focused on tiger conservation to guide and support the 13 remaining tiger range countries in creating and implementing a 12-year Global Tiger Recovery Plan. This collective knowledge culminated in "Securing a Viable Future for the Tiger," a document laying out a comprehensive set of goals and objectives to build upon the progress made over the past decade to stabilize and increase tiger populations while expanding their habitats. This critical work exists at the nexus of our on-the-ground projects and global conservation policies and is greatly needed to ensure lasting change.

Above (left to right): Members of the Boras native community in the Peruvian Amazon; Panthera Malaysia patrol team discussing routes to navigate along the mountainous terrain of Taman Negara, Malaysia; Local Téke community in Gabon

Panthera's conservation of wild cats was founded on our desire to save the species that play irreplaceable roles in their ecosystems and is fueled by our partnerships with the communities that live alongside them. The Orang Asli Indigenous communities, in particular, deserve our deepest gratitude for their commitment to protecting the Malayan tiger and its habitat. As we move forward, our focus will remain on leveraging our shared knowledge, our partnerships and our policy advocacy to protect wild cats and preserve the unique ecological and cultural heritage that wild cats represent. Although the path ahead is challenging, we are optimistic that through collective effort, we can contribute to the survival of these magnificent creatures for future generations.



FRED LAUNAY, Ph.D.
CEO and President



Reflecting on Conservation Success in Kafue National Park

A Q&A WITH JON AYERS,
CHAIRMAN OF THE BOARD



Visit this link to learn more about this game-changing work.

Above (left to right): A lioness and her three cubs in Kafue National Park, Zambia; Lion monitoring team — Isaac Kalio, Nathan Brown Zimba, and Kasonde Mumbi — tracking a collared female in Kafue National Park, Zambia

Panthera Board Chair Jon Ayers is enthusiastic about our case study on Zambia’s Kafue National Park — and with good reason. Over a four-year period, a coalition of NGO’s, led by Panthera and the Zambian statutory authorities, achieved stabilization and potential improvement in lion and leopard populations, collectively investing just \$211 per km² in the peak year, a fraction of the \$1,000–\$2,000 per km² conventionally assumed needed. These impressive gains not only point the way to restoring depleted wild cat populations, but also help the park’s unique wildlife species rebound. Panthera’s Kelly Carton spoke with Mr. Ayers to discuss his takeaways from the study and its implications for wild cat protection in other large, unfenced areas across Africa and globally.

On a continent historically starved for funding, Zambia demonstrated impressive efficiency in protecting 22,400 km². What’s most noteworthy about the study results?

True to its scientific heritage, Panthera used accurate and advanced techniques to measure lion and leopard populations over the four years of the study. The emphasis on measurement originated from the Leopard Program earlier in this decade, when leopard densities had previously been poorly understood. This population trend data was critical to Panthera’s work with the range states on leopard policy. Fortunately, lions were also captured in the surveys.

By employing updated techniques, Panthera had lion and leopard trend data for all four years of the Kafue collaboration. This was important because an understanding of trends in species populations is key to achieving conservation goals. Without accurate population data, how do we know which interventions are effective in saving these umbrella species? The case study is the full package, with interventions and outcomes systematically measured over a meaningful period of time.

The study attributes its productivity in conservation investment to three key factors: 1. utilization of advancing



When you are a philanthropist or supporter, it is hard to be confident that your contribution will be used wisely. And yet, I know that an investment in Panthera will be used efficiently and effectively to protect wild cats and their landscapes.

JON AYERS
Chairman of the Board

technology, 2. employment of best practices in conservation management and 3. a high degree of coordination and collaboration. Tell us a bit more about those factors.

My background in business involved using advances in technology to achieve successful outcomes. Here, I recognized the same success pattern. What impressed me was the sophisticated use of SMART (Spatial Monitoring and Reporting Tool) to learn and improve patrol efficiency. And this learning and improvement reached the members of the patrols themselves, who were motivated by the visual representation of the routes of their patrols, and the data they and others collected.

NGOs usually find it challenging to work together in the same landscape. Yet, in the case of Kafue, just the opposite occurred. Each organization brought unique skills, shared data through SMART technology and collaborated regularly — achieving results together that would not be possible alone.

The study has an entire section devoted to the role that communities played. What role do communities play in Zambia and wild cat conservation more broadly?

Sustainable conservation must include and engage adjacent local communities and provide value to incentivize resource usage in ways not harmful to wildlife, as laid out by Fred Launay, and his opening letter above. In Kafue, several methods were successful, including reducing demand for fur through Panthera’s innovative Furs for Life program and allocating conservation credits.

What most surprised you about the study results?

I was surprised by the extraordinary effectiveness of the collaboration, where each member contributed something unique, and thus the whole was greater than the sum of the parts.

Achieving these population trends in the study on such a low investment per km² has enormous implications for the

conservation of apex species, such as lions and leopards, and the ecosystems they represent. If done correctly, interventions that protect wildlife can be far more efficient than previously assumed. This means that the conservation dollar can go much further. More funding is also left to support local communities and indigenous peoples in or near these landscapes by providing alternative food sources, healthcare, education and economic security.

The case study concludes by suggesting Kafue NP can be a “template” for augmented investment. What are your hopes for replicating this template in Africa and beyond?

One of Panthera’s profound impacts on conservation is in modeling and communicating best practices that can be replicated by others in wild cat landscapes around the world. The publication, distribution and wide press recognition that this case study has received is such a great example of Panthera’s leadership extending far beyond Panthera’s project areas.

What is the one key message about Panthera that you want to impart?

Panthera is an amazing organization with regard to its impact on species and biodiversity conservation. When you are a philanthropist or supporter of nature, it is hard to be confident that your contribution will be used wisely. And yet, I know that the investments that I and others make in Panthera will be used efficiently and effectively to protect wild cats and their landscapes.

Panthera continues to be involved in the park and the surrounding game management areas, to the benefit of the lions, leopards, cheetahs and small cats dependent on this great ecosystem. With the right support, we are prepared to continue stabilizing and increasing wild cat populations, which has a ripple effect on the entire Kafue ecosystem and all of its inhabitants.

Paying It Forward While Giving Back

GOING ALL-IN FOR THE LEOPARD

Leopards hold a special place in the hearts and minds of humankind. From the dawn of recorded history to the present day, these dappled wonders have been iconic symbols of both beauty and brawn, achieving a unique status that, in the vernacular of our own times, constitutes one of the world's most enduring *global brands* — with consistent and singularly enviable recognition, even in countries where they have never left a single pawprint.

The profound cultural connection that humans experience with these majestic cats is as magical as it is powerful. And while the presence — and indeed the plight — of a tiger always makes my heart flutter, the sight of a leopard in any of its myriad permutations inevitably summons to mind, for a passionate wild cat conservationist like me, the painful irony that this most ubiquitous and evocative embodiment of feline grace today faces the most tremendous challenges to its conservation and survival. In fact, for all the universality of the marvel it instills, the leopard likely represents the most persecuted big cat of all in terms of the actual number of animals being killed — not to mention, as with many of its peers, the vast ranges that used to be inhabited and have now shrunk beyond recognition. Once gracefully roaming across the broadest territory of any wild feline, this magnificent creature has essentially vanished from two-thirds of its historic African range and some 84 percent of its former territory in Eurasia. The situation could not be more alarming.

And yet, within dire straits are often found the greatest of opportunities. Panthera, the organization that my wife and I co-founded in 2006 with the late Alan Rabinowitz, Ph.D., dedicates itself to leopard conservation with unparalleled passion and commitment. What sets us apart is both an unwavering devotion to rigorous scientific research and the deep partnerships we have forged over time with a wide range of authorities — from local communities and regional governments all the way to the Kingdom of Saudi Arabia.

In 2022, we bolstered a sensitive cooperation program with tribal leaders in Africa, strengthened a most consequential conservation alliance with Saudi Arabia and leveraged leopard prints to raise awareness about the existential threats facing the species through a collaboration with haute couture powerhouse Dolce & Gabbana. Across our various activities — believed to encompass more leopard-related work than all other organizations *combined* — this unique convergence of the most rigorous scientific expertise and impactful partnerships has allowed us to truly move the needle and bring about tangible, long-lasting improvement in the elaborate arc of leopard conservation.

While Panthera has altered the trajectory in multiple jurisdictions, that is not to say that even we have turned the tide. But we are fighting the good fight across the entire range. Within the leopard subspecies, the smallest in size faces the most critical challenges. In fact, fewer than 150 Arabian leopards remain in the wild — a distressingly low number.

Opposite (left to right): A female African leopard in Kafue National Park, Zambia; Two young leopards in South Africa

Symbolizing grace, beauty and unwavering strength, the Arabian leopard holds considerable cultural significance for the Saudi people and, amidst one of the world's most ambitious reform agendas, their leadership eagerly wants this emblem of Arab nationhood to endure for the benefit of future generations. When His Royal Highness Mohammed bin Salman, Crown Prince of Saudi Arabia, accompanied by his most fervent of leopard advocates, His Highness Prince Badr bin Abdullah Al Saud, personally inquired about the plight of this remarkably elegant species and kindly asked of me how the Kingdom might not only save the Arabian Leopard but, rather than seeing them play catch-up, also assist *other* countries to get ahead of the curve and save their own leopards before it is too late, my message to them was simple yet urgent: worldwide, leopards desperately need a champion to safeguard their future.

Answering this noble call, the Kingdom of Saudi Arabia — through the Royal Commission for AlUla (RCU) — has become a major global supporter of leopard conservation. Last year, in addition to advising on reintroduction, Panthera began assisting RCU in managing the Arabian Leopard Conservation Breeding Centre in Taif, Saudi Arabia — a program representing the species' best shot for survival — and identified three sites in which these marvelous creatures could eventually be released. This watershed alliance fills us with enormous hope as it empowers our ambitious plans for reintroduction to become a reality. We are eager to nurture and expand collaborations like these, while helping re-establish the Arabian leopard population.

Another pivotal partnership that holds immense significance is the one that Panthera has built with the Shembe Church in South Africa and the Barotse Royal Establishment (BRE) of the Lozi People in Zambia. As part of their traditional ceremonies, both communities typically don wild cat skins symbolizing power and strength. However, such reverence has also created a high demand for wild cat skins in return — leading to catastrophic, yet unintended consequences for animal populations. Enter our groundbreaking “Furs for Life” program, a conservation demand-reduction endeavor that has likely saved more big cats than any other of its kind while simultaneously helping preserve rich cultural-religious traditions. Implementing this innovative scheme — which received the backing of Cartier for Nature, a philanthropic initiative launched by the French luxury brand — necessitated the conjunction of numerous fields and skills, including diplomacy, community outreach, anthropological study and, of course, scientific research. The result — the design and production of highly realistic synthetic furs, known as “Heritage Furs” — helped usher in a culturally sensitive resolution to a seemingly intractable conservation problem.

Through extensive engagement and consultation, Panthera has now scaled up the remarkable “Furs for Life” initiative and recorded a nearly 70 percent decrease in the number of authentic skins worn in the 2022 ceremony compared to the 2020 proceedings. Our combined intervention is having a real and concrete impact on leopards in Panthera-monitored



study sites in the Greater Kafue Ecosystem. Last year, we found that leopard populations stabilized while some leopard densities even significantly increased. Deeply rooted in meticulous scientific research and sustained community involvement, this program stands as a truly exemplary model of *applied conservation* — a bona fide gold standard that integrates both ambitious objectives as well as confirmed and measurable outcomes.

While leopard print remains as present as ever in the fashion industry, the conservation status and well-being of the species are nonetheless often absent from the conversation. Research conducted by our long-standing partner, Oxford University's Wildlife Conservation Research Unit (WildCRU) and esteemed scholars, including Dr. Caroline Good and Professor David Macdonald, reveals that around 98 percent of content featuring leopard print fails to mention leopard conservation. Their work — as evidenced so pointedly in the catalytic New Yorker piece of March 2022 by Rebecca Mead, titled “Should Leopards Be Paid for Their Spots?” — has triggered a sea change in perception.

Building upon these efforts, those focused on leopards, such as myself, are fortunate that Celina Chien, an incredibly talented artist, storyteller, and conservationist, took the initiative to make the connection between fashion and leopard conservation — and to do so in a way that is both compelling and invigorating. A fellow Panthera Board member, Chien collaborated in October 2022 with illustrious fashion house Dolce & Gabbana to curate a captivating exhibition titled “LEOPARD: Honouring the Muse.” This wonderful initiative — which I am personally committed, with Her Royal Highness Princess Reema bint Bandar Al Saud, to replicating with Celina across the industry — skillfully employed the power of fashion, art, design and language to evoke empathy for wild cats and forge meaningful bonds with diverse audiences.

In the same realm, Panthera's “Leopard Spotted” campaign encourages leopard lovers who don their patterns to see beyond the spots and give back, either by donating to Panthera or tagging #leopardspotted on social media. As they are often among the leading “umbrella species” in their ranges, leopards and hence their conservation serve not only as the conduit for

safeguarding splendid spotted felines, but also for restoring to the fullest extent the broader ecosystems and biodiversity required for them to flourish. Save the apex predator — and conserve the flora and fauna that are the prerequisites for ensuring the prey and landscape required of the leopard — with the cascade of benefits that the “one-stop shopping” of big cat protection entails.

Seen through that lens, leopards have come to epitomize the essence of a flagship species, transcending boundaries as ambassadors for the conservation of all spotted cats, their vast habitats and the intricate web of thousands of interconnected flora and fauna. Their ubiquitous presence and cultural relevance present a monumental opportunity — one that epic campaigns such as Furs for Life, the Arabian Leopard Initiative and “LEOPARD: Honouring the Muse” seize upon, forcefully championing the cause of *panthera pardus* and ensuring their protection.

Together with the Kingdom of Saudi Arabia, the Shembe Church, the Barotse Royal Establishment, Dolce & Gabbana and other prominent fashion houses, we are recognizing and paying homage to the leopard as we strive to foster harmony between humanity and this extraordinary species. If you, too, want to ensure that leopard rosettes forever grace our planet, I implore you to join me and all of us at Panthera in this critical endeavor. Trust me when I say that saving a species from blinking out on one's watch constitutes the finest of psychic sensations. It's not too late. As goes the Chinese proverb: “the best time to plant a tree is twenty years ago; the second-best time is today.” Together, we can do this. Join Panthera in going all-in for the leopard!



THOMAS S. KAPLAN, Ph.D.
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Chair, The Global Alliance for Wild Cats
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Historic IUCN Tiger Assessment Released

As the world celebrated the Year of the Tiger in the Lunar New Year in 2022, it also marked a critical turning point for the species. The Panthera-led IUCN Red List of Threatened Species Assessment estimated 4,500 wild tigers globally as opposed to 3,200 in the 2015 Assessment. This represents the first potential climb in decades, after poaching, habitat loss and human-cat conflict decimated a wild tiger population that was once as high as 100,000.

Although Panthera’s Chief Scientist, John Goodrich, Ph.D., is more optimistic about tigers than he has been in decades, he cautions against proclaiming “mission accomplished.” While these data suggest more wild tigers exist than in previous assessments, this is partly due to improvements in tiger-counting methodology. When the last assessment was conducted in 2015, scientists had to rely on educated guesses based on a sample area. The new assessment, considered the most reliable and scientifically sound ever, was informed by camera traps, genetic testing, advanced data analysis and government collaboration.



In an op-ed for the environmental news platform Mongabay, Goodrich wrote, “The take-home message is that global tiger numbers have not declined and have possibly increased since the last IUCN assessment in 2015, which is a remarkable achievement against stacked odds.”

Although still listed as Endangered, tiger populations have increased in protected areas in India, Nepal and Thailand. The “recipe” for successful tiger conservation includes increasing protected tiger habitats, collaborating with governments and communities and preventing poaching. The biggest challenge going forward will be customizing and replicating this approach across the 13 tiger range countries — especially in Southeast Asia, where tigers are at an extremely high risk of extinction.



Panthera’s Tigers Forever program addresses the most urgent threats facing tigers — poaching and habitat loss — through a range of complementary strategies. We monitor populations of tigers and their prey, connect and protect tiger habitats and train patrols to secure protected areas. Although the challenges ahead are great, Panthera scientists are optimistic. “If progress continues as it has in the last decade,” Goodrich says, “I fully expect tigers to be reclassified as ‘Vulnerable’ by the next IUCN Red List Assessment in seven to ten years.”



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JOHN GOODRICH, Ph.D.
PANTHERA CHIEF SCIENTIST



Clockwise: A tiger family caught on camera playing in Parsa Wildlife Reserve, Nepal; A tiger in the Eastern Forest Complex, Thailand; Two Malayan tigers in Taman Negara National Park; A female tiger takes a selfie in Nepal; A tiger cub investigates a camera trap in Manas National Park, India; A tiger walks by a camera trap set in Sumatra, Indonesia



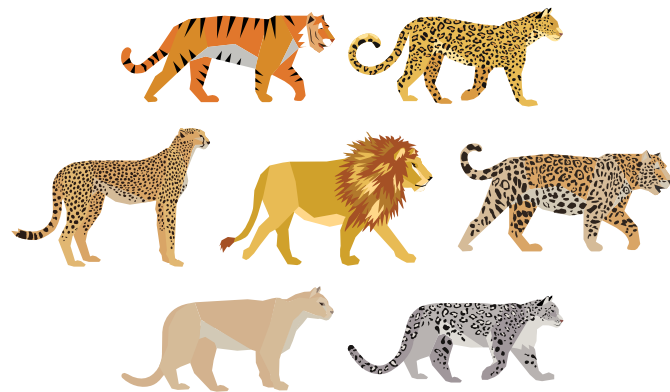
Panthera at a Glance



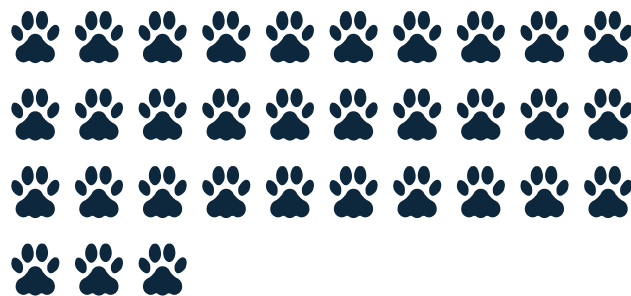
Wild cat species Panthera is devoted to conserving



of the world's landmass is occupied by wild cats.



7
Big Cat Species

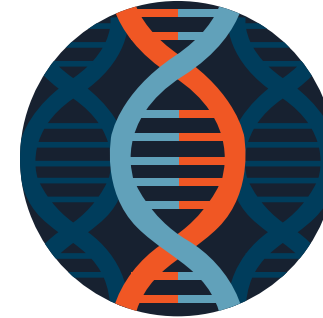


33
Small Cat Species

ASSESS & MONITOR



23,500
PantheraCam camera traps created to date



5
Leopard poaching hotspots identified through DNA analysis

SECURE & RECOVER



18,500
Synthetic furs created, sparing the lives of servals, leopards and lions



12
Acoustic monitors (recorders that detect sound) tracking poachers

PRESERVE & CONNECT

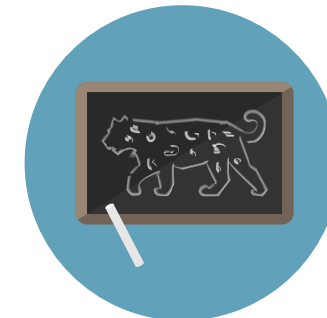


7
Counter-Wildlife Crime information hubs around the globe



6M
square kilometers of habitat prioritized for protection through the Jaguar Corridor Initiative

SUSTAIN



2,145
Children taught the importance of jaguars at Panthera's Jaguar School



40+
Partnerships with government agencies, to sustain lasting change


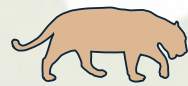
The World of Wild Cats



The 40 species of wild cats reside on five different continents. Scan this QR code to explore Panthera's global project sites in realtime.

Note: Map only shows current big cat ranges

BIG CATS


 Puma <i>Puma concolor</i>	 Jaguar <i>Panthera onca</i>
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SMALL CATS

Andean Mountain Cat <i>Leopardus jacobita</i>	Jaguarundi <i>Herpailurus yagouaroundi</i>	Oncilla <i>Leopardus tigrinus</i>
Bobcat <i>Lynx rufus</i>	Güiña <i>Leopardus guigna</i>	Pampas Cat <i>Leopardus colocola</i>
Canada Lynx <i>Lynx canadensis</i>	Margay <i>Leopardus wiedii</i>	Southern Tiger Cat <i>Leopardus guttulus</i>
Geoffroy's Cat <i>Leopardus geoffroyi</i>	Ocelot <i>Leopardus pardalis</i>	

Europe

BIG CATS

 Lion <i>Panthera leo</i>	 Leopard <i>Panthera pardus</i>	 Cheetah <i>Acinonyx jubatus</i>
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SMALL CATS

African Golden Cat <i>Caracal aurata</i>	Black-footed Cat <i>Felis nigripes</i>	Sand Cat <i>Felis margarita</i>
African Wildcat <i>Felis lybica lybica</i> <i>Felis lybica cafra</i>	Caracal <i>Caracal caracal</i>	Serval <i>Leptailurus serval</i>
	Jungle Cat <i>Felis chaus</i>	

Africa

Asia

SMALL CATS

Eurasian Lynx <i>Lynx lynx</i>
European Wildcat <i>Felis silvestris</i>
Iberian Lynx <i>Lynx pardinus</i>

BIG CATS

 Tiger <i>Panthera tigris</i>	 Snow Leopard <i>Panthera uncia</i>	 Leopard <i>Panthera pardus</i>
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SMALL CATS

Asian Golden Cat <i>Catopuma temminckii</i>	Eurasian Lynx <i>Lynx lynx</i>	Pallas's Cat <i>Otocolobus manul</i>
Asiatic Wildcat <i>Felis lybica ornata</i>	European Wildcat <i>Felis silvestris</i>	Marbled Cat <i>Pardofelis marmorata</i>
Bornean Bay Cat <i>Pardofelis badia</i>	Fishing Cat <i>Prionailurus viverrinus</i>	Rusty-spotted Cat <i>Prionailurus rubiginosus</i>
Caracal <i>Caracal caracal</i>	Flat-headed Cat <i>Prionailurus planiceps</i>	Sunda Clouded Leopard <i>Neofelis diardi</i>
Chinese Mountain Cat <i>Felis bieti</i>	Jungle Cat <i>Felis chaus</i>	Sunda Leopard Cat <i>Prionailurus javanensis</i>
Clouded Leopard <i>Neofelis nebulosa</i>	Leopard Cat <i>Prionailurus bengalensis</i>	

Africa

Panthera's work in Africa often centers on its connection with people — the communities that live alongside wildlife, range state authorities, conservation partners, ecotourism guides and tourists who share a connection with the continent's eight iconic wild cat species. In addition to these ongoing partnerships, increased investments in technology in 2022 helped scale up our efforts to monitor, sustain and protect Africa's wild cats. From Senegal to Zambia, Panthera and its partners achieved notable milestones in 2022, furthering our shared mission to ensure a future for wild cats and their landscapes.



SPOTLIGHT

Kris Everatt Canada Country Manager

Left: A lion silhouetted by the sunset in Mala Mala Game Reserve, South Africa

Above: Kris Everatt and an anesthetized male lion in Niokolo-Koba National Park, Senegal

Opposite: Kris Everatt, Carnivore Technician Mouhamadou Mody Ndiaye, and Senegal government veterinarian Mouhamadou Makhtar Fall, Ph.D., sit with a young anesthetized lioness after removing porcupine quills from her face.

Kris Everatt, Ph.D., Canada Country Manager, has been lucky enough to work in close proximity to Africa's three iconic big cats: lions, leopards and cheetahs. Having spent more than a decade studying apex carnivores in Africa, he has a deep understanding of their ecology and conservation needs.

In 2021, Everatt led the first-ever successful lion collaring campaign in Senegal's Niokolo-Koba National Park. The team fitted six Critically Endangered West African lions with GPS collars, providing critical data on the region's lion population. National Geographic spent a week documenting the undertaking. Everatt told Nat Geo, "We select lions not just because they're really cool, and we love lions — but also because they play such a key role in a functioning ecosystem."

The six lions are a beacon of hope for the park's rebounding population of 30 lions, up from 10 to 15 in 2011. Panthera's Senegal team oversees persistent scientific monitoring and anti-poaching efforts with an ambitious goal: to increase the lion population to 50 lions by 2025, then to 100 lions by 2030. But that is just the beginning. A restored lion population will benefit the thousands of other species who live alongside them and foster a thriving ecotourism economy.

Everatt's research focuses on the intersection of humans and wildlife and he enjoys learning from the communities that live alongside lions. He also mentors a Senegalese Wildlife Technician, Mouhamadou Ndiaye, who is responsible for monitoring the lions. In close collaboration with Senegal's Directorate of National Parks, the Panthera team, which consists of predominantly local staff, has spearheaded a campaign highlighting the Park's importance. Everatt firmly believes the best strategies to protect lions are informed by those who know the species best — the communities that live alongside them.

We select lions not just because they're really cool, and we love lions — but also because they play such a key role in a functioning ecosystem.

**KRIS EVERATT, PH.D.
CONSERVATION SCIENTIST**



Wins for Wild Cats in Zambia

Zambia’s Kafue landscape is a haven for wild cats. Panthera has worked collaboratively with several other conservation NGOs, under the leadership of Zambia’s statutory authority, to reverse the decline in wild cat numbers, and has recently co-authored a case study on the groundbreaking methods and results achieved over several years.

Panthera measured the population densities of lions and leopards over four-plus years, as indicators of overall biodiversity vibrancy. The outcomes for cats demonstrate the incredible power of advanced technology, including SMART (Special Monitoring And Reporting Tool) as a visually impactful information mapping application. SMART allows for seamless collaboration of wildlife police officers and related personnel who patrol the park, keeping the wildlife safe from illegal activity. Throughout, Panthera was actively involved in community engagement through a wildlife credits program and the reduction in human-wildlife conflict at the edges of the protected area.

The Kafue case study serves as a template for future wild cat conservation programs, demonstrating how exceptional results can be achieved on an limited budget. Critical components are collaboration with the range state and the adoption of advanced technologies and methods, while serving the needs of nearby communities.



Astonishing Results from New Sand Cat Study

In the first-ever telemetry study of African sand cats, Panthera and the Cologne and Rabat Zoos observed a large sample size of 47 cats, capturing 41 and fitting 22 with VHF collars. The first of two fascinating findings was that sand cats have much larger home ranges than previously reported, likely due to sparse vegetation and prey. African sand cats may even be nomadic — behavior never before seen in wild cats. Second, the cats studied did not exhibit injuries or broken teeth, suggesting that the species is not territorial and are tolerant of each other. Research on sand cats is greatly needed, and this study’s scale and outcomes has enriched the existing knowledge base on these small cats.



Furs for Life

Panthera’s Furs for Life Program was born from a need to address the largest demand source for leopard skins in Southern Africa: ceremonial attire. Working collaboratively with a textile manufacturer and the Shembe Church in South Africa and the Lozi People — led by the Barotse Royal Establishment (BRE) in Western Zambia — we created “Heritage Furs,” which are synthetic, realistic alternatives to animal skins.

The Shembe traditionally wore a leopard skin shoulder garment in a ceremony called the Mgidi, wherein men dance in a prayer. Now, nearly 50 percent of garments worn are Heritage Furs. Meanwhile, in Zambia, Lozi paddlers routinely wore ceremonial skirts made of leopard skins in the Kuomboka and Kufuluhela ceremonies. But during the 2022 ceremony, the adoption rate of Heritage Furs among paddlers was as high as 76 percent. The latest data from the Kafue Greater Ecosystem shows an increase in leopard populations within 5 study areas, which, along with other Panthera interventions, could be attributed to the introduction of the Heritage Furs.

Above: Lion monitoring team — Isaac Kalio, Nathan Brown Zimba and Kasonde Mumbi — tracking a female lion in Kafue National Park, Zambia

Right (top and bottom): Lozi paddlers wearing ceremonial attire during the Kuomboka ceremonies.



Citizen Science in Sabi Sands

Panthera’s Sabi Sands Leopard Project is playing a crucial role in the efforts to conserve leopards, which are among the most hunted big cat species in the world. As the longest and most comprehensive study of its kind, the Project collects essential data on 85 resident leopards in South Africa’s Sabi Sand Nature Reserve, Mala Mala Game Reserve and Sabie Game Reserve. During an initial test across five lodges for two months, an astounding 284 leopard sightings were recorded. In 2022, our team rolled out a customized app to enable guides to seamlessly record georeferenced sightings of individual leopards. Thanks to Panthera’s connection with local lodges and their guests, we can collect abundant data on leopard behavior, including social interactions, mating behavior, kill presence and group composition.

Above (top to bottom): A sand cat wakes up under the shade of a car after being fitted with a radio collar; Members of the Sand Cat Sahara team tracking sand cats in the Moroccan desert

Right: A leopard is spotted by a tour group in South Africa’s Sabi Sand Nature Reserve.



Asia

As the continent with the greatest number of wild cat species, 20, Panthera's work there is critical to fulfilling our mission. From protecting small cats in the lush rainforests of Borneo to gathering support for the reintroduction of Arabian leopards in the arid desert of Taif, our partnerships with government agencies and communities guide our approach.



SPOTLIGHT

Abishek Harihar Tiger Program Director

Left: A tiger stalks through Ranthambore National Park, India

Above: Abishek Harihar, Panthera's Tiger Program Director, places a camera trap to monitor tiger populations.

Opposite (left to right): Rob Pickles, Abishek Harihar and Chris Hallam in Manas National Park, India, in 2020; Abishek Harihar at the 2022 Panthera's Director's Meeting.

The year 2022 was remarkable for tigers. According to the new IUCN Red List of Threatened Species Assessment, the global population of tigers is stable and potentially increasing for the first time in decades. Newly appointed Tiger Program Director Abishek Harihar, Ph.D., contributed to this historic assessment, which estimated that the global tiger population, although still endangered, is likely stabilizing or even increasing in some places. Although Harihar urges "cautious optimism," the assessment represents the first reasonable baseline tiger estimate against which scientists can measure future changes.

Harihar is also passionate about raising awareness of tiger conservation. In 2022, in partnership with WWF-India and WCS-India, Harihar led a series of educational webinars called Tiger Dialogues, which brought together tiger experts to discuss the most pressing conservation issues. He also interacted with children about tigers in an online classroom; the 54 global classrooms that tuned in live learned not only about basic tiger biology but also about keys to the species' recovery. One essential activity is to build local capacity within the communities that live alongside tigers. He told the students, "What's really important is to ensure the communities we work with are safe, protected and that their livestock is protected — this is critical if we want to see tigers recover and thrive."

Now leading Panthera's Tigers Forever Program, Harihar is furthering our efforts to increase tiger numbers at key sites by at least 50 percent over a 10-year period by monitoring tiger and prey populations, training anti-poaching patrols to secure protected areas and connecting and protecting tiger habitat. He said he dreams of a world where all children, including his son, "appreciate both the unique ecological role wild cats play and the persistent efforts made by communities and conservationists, against so many odds."

What's really important is to ensure the communities we work with are safe, protected and that their livestock is protected — this is critical if we want to see tigers recover and thrive.

**ABISHEK HARIHAR, PH.D.
TIGER PROGRAM DIRECTOR**

Southeast Asia

Home to more than half of Asia's 20 wild cat species, Southeast Asia is a priority region for Panthera's Small Cats Program. In 2022, Panthera made important progress toward mitigating habitat loss and fragmentation — the main threat facing small cats in Southeast Asia. Notably, our team devised collaborative forest and small-cat protection solutions with local communities and conducted key research on threats to fishing cat habitats.



SPOTLIGHT

Beathres Petrus Community Engagement Officer

Left: Rainforest of Deramakot Forest Reserve, Sabah, Borneo, Malaysia

Above: Beathres Petrus on patrol in Sabah, Borneo, Malaysia

Opposite: Haostin Jineh, Jeruslee Joseph, Jaffly Jubili and Beathres Petrus on patrol in Sabah, Borneo, Malaysia in the Tangkulap Forest Reserve, Sabah, Malaysia



What began as a passion for animals evolved into a career on the front lines of wild cat conservation. Beathres Petrus, newly appointed Community Engagement Officer in Malaysian Borneo, spends up to seven days in the field at a time. Without access to paved roads, Petrus must walk for up to three and a half miles, navigating through dense forests and challenging terrain. However, Petrus has yet to encounter a wild cat in the field. Instead of deterring her, this has served as motivation. She wants to create a world where wild cats are abundant. Securing the wild cat population in Borneo will also ensure the integrity of the entire ecosystem.

Petrus is just one member of our Project Dupot team, which focuses on conserving the island's small cats, including the Sunda clouded leopard, marbled cat, leopard cat, Bornean bay cat and flat-headed cat. These species are primarily threatened by habitat fragmentation caused by large oil-palm plantations and the illegal wildlife trade. In partnership with the Sabah Wildlife Department, Sabah Forestry Department and communities, Panthera is refining patrol strategies and using camera traps to plan effective traffic stops. Community patrols have been integral to this work, along with the Dusun and Sungai Indigenous people, who comprise the majority of our Project Dupot team.

Although the work is challenging and, at times, dangerous — Petrus has had run-ins with both elephants and swarms of wasps — she draws inspiration from the community members she works alongside. One of her favorite parts of her work is collaborating with individual community members in designing ways to protect wild cats. Her aim is to create cooperative strategies to safeguard these small cats and provide tangible livelihood benefits, to ensure both communities and wild cats can thrive.

I want to devote myself to the future of wildlife — especially wild cats and I hope that one day it will be easier for humans to find wild cats and get to see them with their own eyes.

**BEATHRES PETRUS
COMMUNITY ENGAGEMENT OFFICER**



Plastics Impact Fishing Cat Habitats

In 2022, a research team including Laurel Serieys, Ph.D., Panthera's Small Cats Program Conservation Scientist, set out to determine the level of plastics in fishing cat scat. After analyzing 276 scat samples, the team found that 1.45 percent contained macroplastics (larger than 25 mm) and 2.17 percent contained macroscopic plastics (larger than 1 mm). Although these are small amounts, the detection of any plastic is concerning. Because fishing cats consume live prey, these results suggest that a trophic transfer (when contaminants transfer between food chain levels) is taking place whereby fishing cats consume prey contaminated with plastic. Additionally, it appears that plastic is accumulating in wetland food webs, which poses a serious risk to predators like fishing cats. Coupled with habitat protection and collaboration with communities to foster coexistence, research like this guides the most impactful fishing cat conservation.

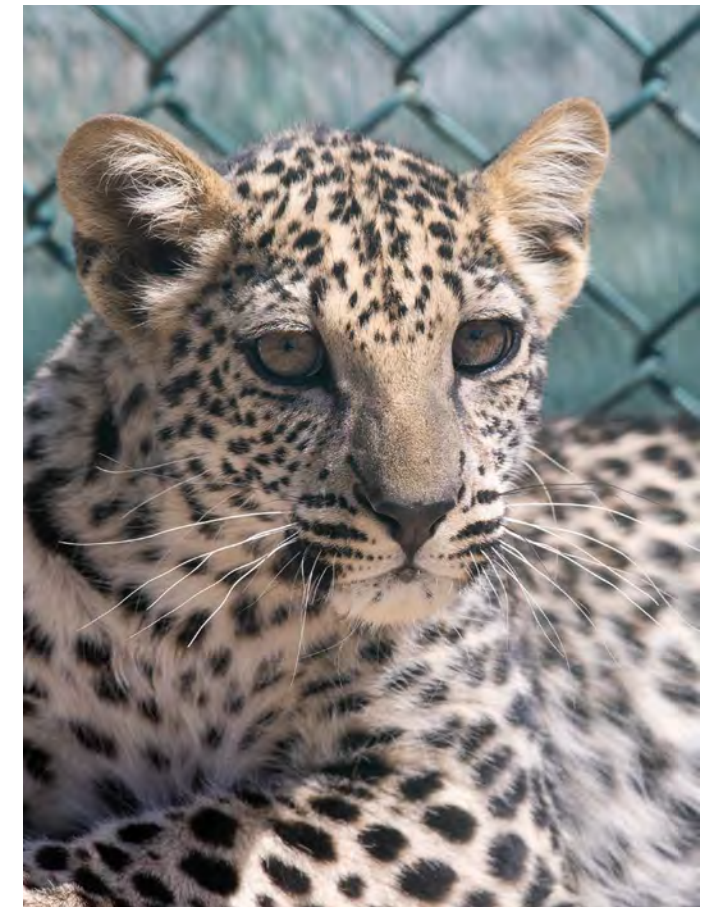
Above (clockwise): Biologists Chaiwat Klakhaeng and Thaksin Wongson set up a camera trap in Khao Sam Roi Yot National Park, Thailand; Biologists Pathompong Wichitdecha and Jetsadakorn Buaket set a camera trap in the Western Forest Complex, Thailand; Biologists Oapagorn Sangkomol and Jetsadakorn Buaket check camera trap from sWEFCOM; A fishing cat in an abandoned industrial shrimp farm near Khao Sam Roi Yot National Park, Thailand

Tigers Forever Update

Thailand's Southern Western Forest Complex (sWEFCOM) is part of the country's largest patch of forest, which connects tigers with their habitat in Myanmar. Encroachment by humans, bushmeat hunting and human-cat conflict have created a perilous environment for the local tiger population. However, complementary solutions from Panthera, the Department of National Parks, Wildlife, and Plant Conservation and Khao Nang Rum, a Wildlife Research Station, including local capacity building and trainings, have contributed to the tiger population in the Western Forest Complex doubling in the past decade. In 2022, Panthera Thailand helped secure a non-hunting area where tigers can roam safely. Our research has shown that sWEFCOM has capacity for 37 tigers and, until we reach that goal, Panthera will continue monitoring and protecting tigers and their prey.

Middle East

With fewer than 150 wild Arabian leopards remaining, Panthera doubled down on its conservation efforts for the species in 2022. This complex project is two-fold: We need to breed and cultivate a population of healthy Arabian leopards and prepare a suitable habitat for their eventual release. In 2022, Panthera made significant progress in both project areas, bringing us one step closer to reaching our goal of reintroducing Arabian leopards into the wild by 2030.

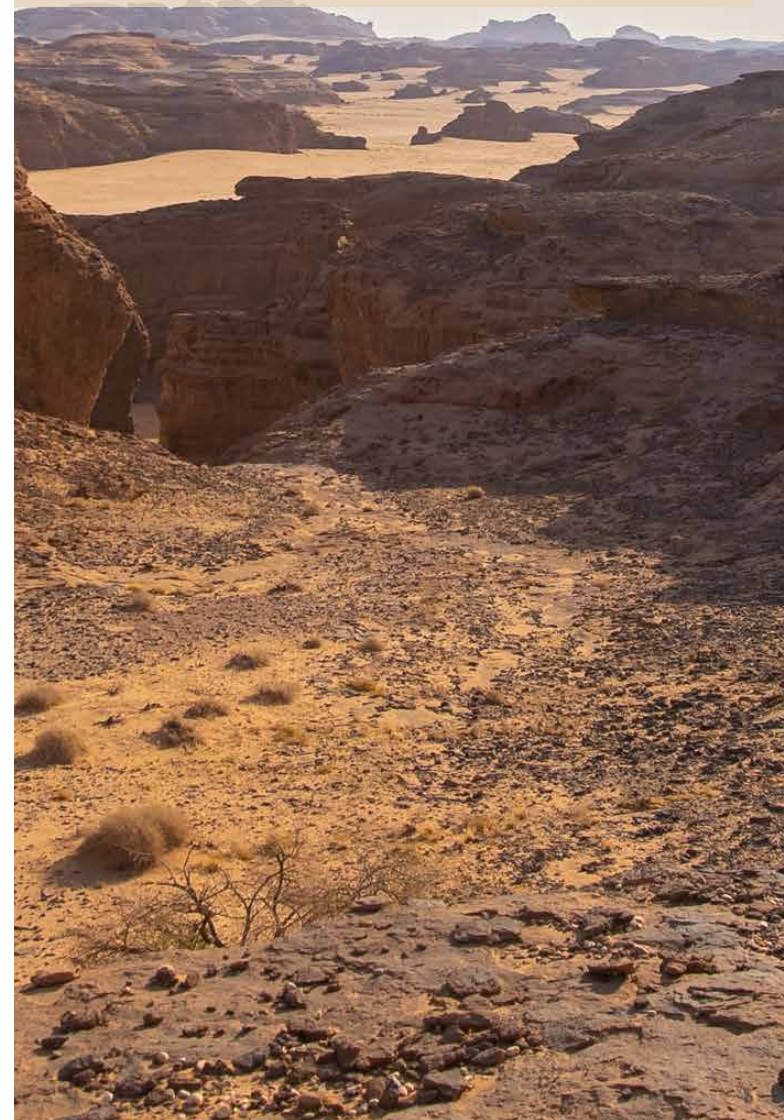


Arabian Leopard Initiative

In 2022, Panthera began co-managing the Arabian Leopard Conservation Breeding Centre in Taif, Saudi Arabia. Working closely with the Royal Commission for AlUla (RCU), we are improving all aspects of the center, including creating larger, more natural enclosures. Panthera and RCU are focusing on breeding more cubs, a new generation that is better prepared to survive in the wild. In another big step toward reintroduction, we pinpointed three priority sites for their eventual release, where we will stabilize leopard prey populations and help improve site security. Panthera is also working alongside neighboring communities to foster tolerance of leopards by introducing techniques like predator-proof enclosures, livestock guardian dogs and visual and auditory deterrents. The support of these communities is crucial to our success.

Left: Sharaan Nature Reserve, Saudi Arabia

Above: An Arabian leopard cub born in the Taif Breeding Center, Saudi Arabia



The Americas

THE UNITED STATES

While followers of the Lunar New Year celebrated the tiger in 2022, pumas captured the attention of the American public. The puma increases biodiversity and has the largest range of any terrestrial mammal in the Americas, developing an important role within communities across the region, from Alaska to Argentina. Within the puma range in the United States, Panthera worked alongside communities to conduct important research and bolster community support for the species' protection in 2022 and beyond.



SPOTLIGHT

Caitlin Kuper Olympic Cougar Project Coordinator

Left: Temperate rainforest in Olympic National Park, Washington

Above: Caitlin Kuper holds a puma kitten from a den in the Olympic Peninsula, Washington State, USA.

Opposite: Caitlin Kuper collars an anaesthetized puma in Torres del Paine National Park, Chile.



Long before Panthera's Olympic Cougar Project (OCP), local tribes were caring for the land, water and wildlife of Washington State's Olympic Peninsula. That's why Caitlin Kuper, Project Coordinator, is honored to work closely with and learn from tribal collaborators, saying, "The tribal members we work with remind us of the big picture — that everything is connected."

However, human developments are threatening that very connectivity. In 2022, new research emphasized this issue's severity — pumas on the Olympic Peninsula have the highest rate of inbreeding and the lowest genetic diversity of any in Washington. Such genetic diversity is necessary for the species' resiliency to disease and overall evolution. Since 2018, the OCP has been GPS collaring pumas on the Peninsula in order to obtain spatial data that will aid in deciding where to build a wildlife crossing on the I-5 highway. This new research is further validation that the work we are doing is not only vital, but time-sensitive.

In partnership with six tribal nations, Panthera fitted more than 40 pumas with GPS collars in 2022 alone. GPS tracking contributes to a wealth of knowledge about the species, including their feeding, breeding and dispersal patterns. Tracking pumas takes Kuper and her team "quite literally everywhere on the landscape" — from snowy mountainsides to dense forests and

rugged coasts — requiring the team to hike and traverse great distances.

Kuper looks forward to seeing how the collaborative work on the OCP will help inform connectivity on the peninsula and contribute to management methodologies for not only pumas but multiple culturally important species.

The tribal members we work with remind us of the big picture — that everything is connected.

**CAITLIN KUPAR
OLYMPIC COUGAR PROJECT COORDINATOR**



Island Hopping Pumas

Puma habitat is shrinking on the United States' Olympic Peninsula as major roadways and other human developments are transforming its lush forest into an island. But a young male puma, Nolan, has challenged prevailing perceptions of puma connectivity. Shortly after being fitted with a GPS collar, Nolan's location was detected on an island in the Salish Sea — an astounding 1.1 km from the mainland. Scientists from Panthera and partner tribal nations have estimated that other “island hopping” pumas could potentially access at least 62 percent of the 6,153 nearby islands. A better understanding of pumas' swimming abilities helps the species' conservation by identifying wildlife corridors not previously known to exist.

Above (left to right): A rare swimming puma caught on camera in British Columbia; A puma investigates a camera trap in Big Bend National Park, Texas.

Opposite: Biologist Andy Stratton collects data from a puma kill in the Olympic Peninsula, Washington

Protecting Pumas in Texas

Of the 16 U.S. states with breeding populations of pumas, Texas is the lone state without regulations regarding harvesting, hunting seasons or reporting. As a result, mortality rates for pumas in Texas are among the highest in the country; in one study, humans killed all 16 of the pumas involved. In 2022, Panthera co-authored a paper calling on Texas to implement the first-ever puma-management policy and submitted a petition for rulemaking alongside the Texans for Mountain Lions coalition.

Although the petition was denied, the state required the formation of an advisory group. Panthera will continue to work alongside communities in Texas until a management plan is implemented. In the meantime, Panthera is building community support by producing outreach materials for rural communities, and ramping up educational efforts to eliminate inhumane traps — the leading cause of puma mortalities in Texas.



The Americas

MESOAMERICA

Mesoamerica is where it all began for Panthera, where co-founder Alan Rabinowitz, Ph.D., helped establish the world's first jaguar preserve in Belize's Cockscomb Basin. Today, across Mesoamerica's vast jungles, billowing volcanos and ancient ruins, Panthera has a stronger presence than ever. Each of our six projects in the region engages communities — partnerships that were central to our success in protecting wild cats in 2022.



SPOTLIGHT

Dr. Roberto Salom Pérez Costa Rica & Mesoamerica Director

Left: Stephanny Arroyo-Arce and scat-sniffing dog Tigre in Costa Rica

Above: Roberto Salom Pérez points out a jaguar track in Braulio Carrillo National Park, Costa Rica

Opposite: Roberto Salom Pérez and Doña Silvia, Costa Rica; Pérez and his sons.



It was a full six months into his field work for his Master's program before Roberto Salom Pérez, Ph.D., witnessed his first wild cat. While hiking to meet friends in Costa Rica's Corcovado National Park, he stopped dead in his tracks when he saw a puma. Relaxed, the cat and the human curiously studied each other. Soon enough, the puma yawned, leaving Salom Pérez to continue on.

Today, Salom Pérez is the Director of Panthera Costa Rica and our Mesoamerican Hub, overseeing six comprehensive projects that protect Mesoamerica's six wild cat species. These projects address the two biggest threats facing the region's wild cats: human-cat conflict and habitat fragmentation. When jaguars and pumas prey on livestock, the results can be catastrophic for all involved — many rural farmers rely on livestock for their livelihoods and may kill a big cat in retaliation.

Fortunately, Panthera, under the coordination of Field Biologist Daniel Corrales and the Costa Rican Ministry of the Environment, devised a collaborative solution with a nearly 100 percent success rate. Our Wild Cat Conflict Response unit works directly with local farmers and communities to implement tools that proactively prevent predation, including light-emitting livestock collars, low-voltage electric fences and maternity paddocks.

It's been years since Salom Pérez saw that first puma, but the memory of that calm, gentle cat sticks with him. "I think that we humans have to learn not only the value of these animals, but also, that we share this world with them," he says. "Community members have told me, 'I understand that we invaded the big cats' home.' We have to find a way to coexist — and Panthera has proven there are many ways to do so. Places with these beautiful animals are the better for it."

We have to find a way to coexist — and Panthera has proven there are many ways to do so. Places with these beautiful animals are the better for it.

**ROBERTO SALOM PÉREZ, PH.D.
COSTA RICA & MESOAMERICA DIRECTOR**



The Legacy of Howard Quigley

In 2022, Howard Quigley, Ph.D., Panthera’s Conservation Science Executive Director and Jaguar Program Director, passed away at the age of 70. One of the world’s foremost experts on wild cats, Quigley spurred strategies that increased jaguar connectivity and coexistence with communities. Together with his long-time friend and colleague, the late Alan Rabinowitz, Ph.D., he spearheaded the Jaguar Corridor Initiative — the only conservation program protecting jaguars throughout their range, from Mexico to Argentina. Their efforts grew into a global partnership called the Jaguar 2030 Roadmap, which aims to secure 30 priority jaguar landscapes by 2030.

Shortly after Howard’s passing, the Parties to CITES (the global treaty on wildlife trade) adopted resolutions to eliminate jaguar poaching, mitigate threats to connectivity and recognize jaguars as the flagship species of the Americas. The 18 jaguar range states will soon agree upon a collaborative platform under CITES and CMS (the UN Convention on migratory species) to save this iconic big cat and its contributions to global biodiversity, a testament to Quigley’s indelible impact. The Roadmap is in good hands under one of Quigley’s mentees, Allison Devlin, Ph.D., who was promoted to Jaguar Program Deputy Director in mid-2022.

Above (left to right): Alan Rabinowitz, Ph.D., and Howard Quigley, Ph.D., collect data from an anesthetized jaguar in the Pantanal, Brazil; Howard Quigley and Sandy Pereira set a camera trap in Honduras while on the Journey of the Jaguar

Opposite: Howard Quigley on a Journey of the Jaguar expedition in 2022

The Americas

SOUTH AMERICA

The Pantanal, the world's largest inland tropical wetland and home to thousands of species, is one of the most important biodiversity landscapes in the world. Last year, Panthera conducted critical research focused on ocelots — the largest of the region's small cat species — which structure their ecosystem by regulating prey abundance and potentially limiting infectious disease. Our research will have a ripple effect not only on our understanding of the species and their prey, but also the viruses present in their habitats, which have the potential to affect us all.



SPOTLIGHT

Raíssa Sepulvida Field Technician

Left: The sun rises over a lagoon in the Pantanal, Brazil.

Above: Panthera field technician Raíssa Sepulvida investigates ocelot prey at a feeding site.

Opposite: Raíssa sets a camera trap near a box trap for ocelots in the Pantanal, Brazil.

Raíssa Sepulvida, a Ph.D. student and Panthera Field Technician, spends her days working with the Pantanal's wild cats — a dream once unimaginable. She didn't think it possible for a woman to run projects in such a remote, male-dominated landscape. Fortunately, her mentor, Nina Attias, proved such a career path was possible. Then, in 2020, devastating wildfires in the Pantanal reignited Sepulvida's commitment to the field of conservation.

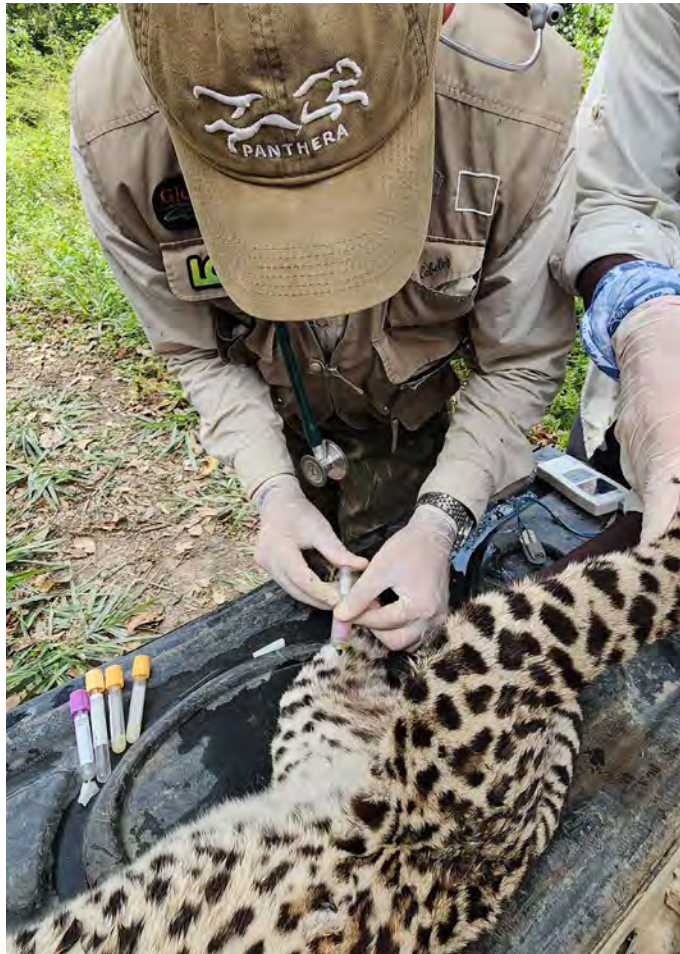
"Losing the wild is losing part of ourselves," says Sepulvida. To her, we are a part of nature. A healthy ecosystem relies on healthy carnivores, prey and humans — which is why she is collaborating with renowned veterinarian Dr. Joares May Jr. and Brazil's National Network for the Surveillance of Viruses in Wild Animals (PREVIR) to survey potential parasites and viruses in both ocelots and their prey around Panthera's Jofre Velho Conservation Ranch. The project aims to better understand ocelot prey and monitor viruses that could jump between species. Its holistic approach incorporates ecological interactions to uncover how different landscapes affect parasites.

This project adds important context to Sepulvida's research on the drivers of ocelot movement, territoriality and habitat preference. Responsible for planning and conducting collaring campaigns, the Panthera Brazil Team must be creative when

working with these smart, elusive cats. Raíssa built "artificial marking sites" to capture and collar the ocelots. However, she will need to change her approach before the next collaring, as the ocelots may catch on. Sepulvida hopes that one day, communities near and far will understand the deep connection these cats have with the health of their habitat.

Losing the wild is losing part of ourselves.

**RAÍSSA SEPULVIDA
FIELD TECHNICIAN**



Ocelot Collaring in the Pantanal

Wild cats — particularly small cats — are notoriously elusive, making fitting them with GPS collars no small task. However, in 2022, the Panthera Brazil Team, including Ms. Sepulvida, successfully collared six ocelots. The project aims to collect vital data on ocelot diet, microbiological agents, habitat use and preferences and population density. An important component of this project is a One Health assessment (an approach to attain optimal health for people, animals — wild and domestic — and the environment). Though small, these elusive cats are big contributors to their habitat — regulating prey abundance and infectious diseases — and Panthera’s research will inform impactful conservation efforts.

Above (left to right): Field technicians Raíssa Sepulvida and Fernando Tortato draw blood and collect data from a trapped ocelot. The cat is then fitted with a radio collar and released.

Opposite: A female collared ocelot near a livestock corral in the Pantanal, Brazil





Publications and Science

In 2022, Panthera scientists authored nearly 100 scientific publications. Highlights include:

COLLABORATIVE BEHAVIOUR AND COALITIONS IN MALE JAGUARS (PANTHERA ONCA)—EVIDENCE AND COMPARISON WITH OTHER FELIDS

Panthera and partners conducted a study that revealed collaborative behaviours among jaguars, challenging perceptions of the species as strictly solitary. After evaluating 7,062 records of male jaguars, researchers determined that under certain conditions, male jaguars form coalitions. For the first time ever, the team documented more than 100 cases of male-male interactions, including two pairs of jaguars that collaborated for more than seven years. Much like cheetahs and lions, jaguars exhibited cooperative behaviors like marking territory, joint patrolling and feeding. Jaguars are more likely to form coalitions based on the concentration of females in flooded forested savannah environments. The probability that two jaguars will collaborate is higher when prey is abundant and the mean size of the female home range is small.

PUMAS (PUMA CONCOLOR) AS ECOLOGICAL BROKERS: A REVIEW OF THEIR BIOTIC RELATIONSHIPS

In this meta-analysis, Panthera and Defenders of Wildlife reviewed 162 publications focused on puma interactions and their impact on ecosystems. The team found that pumas maintain 543 different kinds of relationships with 485 species, including birds, plants, insects and other carnivores like wolves. Pumas also perform a number of services that benefit human economies, health and well-being, including feeding on prey that ultimately mitigates vehicle collisions, and limiting the spread of wildlife diseases. Also, by hunting in the same areas, prey remains release nitrogen, phosphorus and carbon, creating nutrient-rich soil quickly taken up by adjacent plants. These diverse interactions increase energy and nutrient pathways that keep puma ecosystems healthy and resilient.

TROUBLED SPOTS: HUMAN IMPACTS CONSTRAIN THE DENSITY OF AN APEX PREDATOR INSIDE PROTECTED AREAS

Panthera led the most comprehensive evaluation of factors driving leopard density in protected areas. Using camera-trap survey data from 27 protected areas in South Africa, the team found that human activity in and around protected areas is the single biggest factor impacting leopard density. While large, protected areas can certainly effectively conserve wildlife, they are often under-resourced, reducing their effectiveness. The team concluded that instead of building more “paper parks” that are small and lack sufficient protection, reserve managers should seek to increase safety within protected areas. Conservationists should strive to foster contiguous networks of protected areas by reducing threats to leopards around protected areas. To thrive, leopards require large, well-protected wilderness areas with low levels of human impact.

LEARNING FROM PERPETRATOR REPLACEMENT TO REMOVE CRIME OPPORTUNITIES AND PREVENT POACHING OF THE SUNDARBANS TIGER

This study examined what happened after a successful counter-piracy campaign in the Bangladesh Sundarbans shut down the dominant tiger poaching group: the pirates. Dr. Nasir Uddin of the Center for Integrative Conservation worked with Panthera to conduct an analysis of the poaching situation between 2000 and 2017 and after the pirate era of 2018 to 2021 using interviews with poachers, traders and ex-pirates. Uddin found that removing the pirates triggered new tiger poaching groups to emerge and shortened supply chains to consumers. This led to the tiger poaching problem worsening. This cautionary tale illustrates the importance of thinking beyond arresting poachers and considering crime prevention. The team identified nine interventions to remove tiger poaching opportunities and prevent the problem from reoccurring.

Genetics

Snow leopards are some of the most elusive mammals in the world. However, non-invasive genetic sampling provides new insights about the species and in 2022, Panthera completed two important projects studying snow leopard genetics.

In the first study, with support from dozens of range-state partners, the Conservation Genetics team examined the range-wide genetic structure of more than 200 individual snow leopards across ten countries in High Asia — the largest snow leopard genetic study ever. They discovered genetic patterns indicating three historical lineages and two global populations. Interestingly, they also found genetic evidence of areas that remained ice-free during the last Ice Age (glacial refugia), preserving snow leopards and their ecosystems during that period.

Panthera also examined the influence of environmental variables on creating patterns of genetic diversity across five countries. The findings showed that some environmental aspects of the landscape do inhibit movement and shape patterns of genetic distance between snow leopards. This better understanding of gene flow and connectivity will help inform conservation efforts to protect important snow leopard habitats and the linkages between them.

Collaboration is an essential aspect of this work and the team is working closely with other conservation geneticists to review advances in the field. These new genetic data are informing an updated snow leopard distribution model, an essential leap forward for a species about which so little is known.

Above (left to right): Allison Devlin tracking wild cats with telemetry in the Pantanal, Brazil; A four-month old puma kitten feeding on a kill in Grand Teton National Park, Wyoming.

Opposite (left to right): A leopard in South Africa; Snow leopard veterinarian John Ochsenreiter examines snow leopard blood samples in Kyrgyzstan

Policy and Partnerships

As wide-ranging carnivores, wild cats move across borders and between protected areas and human-dominated landscapes, creating both conservation challenges and opportunities. We work with governments and other institutions to develop science-based approaches that help mitigate the threats to wild cats and improve the lives of people living with them, so both can thrive. In 2022, Panthera engaged in numerous global environmental policy fora, advocating for protection and recovery of wild cats and their landscapes to help tackle the intertwined crises of biodiversity loss and climate change.

GLOSSARY OF ACRONYMS

CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CMS	Convention on Migratory Species
GEF	Global Environment Facility
IUCN	International Union for Conservation of Nature
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNODC	United Nations Office on Drugs and Crime
WWF	World Wildlife Fund
WCS	Wildlife Conservation Society

74%

74 percent of the most important land-based places for nature overlap with wild cat habitats. In a **WASHINGTON POST** op-ed published on the eve of the Global Biodiversity Conference, John Goodrich, Ph.D., Panthera’s Chief Scientist, highlighted the importance of protecting and recovering wild cats and their landscapes in addressing biodiversity loss and climate change. Goodrich maintained that wild cats — as umbrella, flagship and keystone species — are both drivers of biodiversity and clear, compelling indicators of progress. The piece provided food for thought about how wild cats can help governments meet their commitments under the global agreements on biodiversity and climate.



30%

30 percent of the earth’s land and sea will be conserved by 2030 under the Kunming-Montreal **GLOBAL BIODIVERSITY FRAMEWORK (GBF)**. Panthera applauded the adoption of the GBF by the world’s governments as a major step forward in addressing the biodiversity crisis by protecting, restoring and recovering critical habitat, halting extinctions, and empowering Indigenous People and Local Communities. In a statement, Fred Launay, Ph.D., Panthera CEO, said, “This historic agreement cements in the public consciousness that nature loss is reversible and that our lives depend on it. Wild cats, with their reach, recognition and cultural importance for billions of people around the world, have the power to bring us together, drive our recovery, and be the ultimate indicators of our success.”

37

37 Decisions on Asian and African big cats were adopted by the Parties to CITES at **COP19**. The Decisions direct Parties to take action to stop demand and illegal trade in big cat parts, hold facilities keeping and breeding Asian big cats accountable and, in the case of cheetahs, strengthen legislation to curb illegal trade in live animals, which is threatening some populations with extinction. For the first time, the Parties adopted a series of Decisions on Jaguars, which aim to facilitate cooperation among range countries to halt the illegal trade in jaguars, an emerging issue whose extent is still poorly understood, and conserve the species throughout their range as the flagship species of the Americas.

Above: Members of the Boras native community in the Peruvian Amazon
 Opposite (clockwise): Artist-designed jaguar statues on display in New York City as part of the first Jaguar Parade; A female Bengal tiger walks through Bandhavgarh National Park, India; Snow leopard fur

40

40 artist-designed jaguar statues prowled iconic locations throughout New York in the City’s first **JAGUAR PARADE**. Panthera brought together leading partners and sponsors to launch the eye-catching art exhibition, which raised awareness and funds for jaguar conservation. Panthera, WWF and WCS, together with UNDP, UNEP, UNODC, the World Bank and the Secretariats of GEF, CITES and CMS, form the Jaguar 2030 Coordination Committee. The Committee works with jaguar range countries to facilitate the implementation of the Jaguar 2030 Roadmap, a framework to secure connectivity among jaguar populations from Mexico to Argentina. The Committee organized multiple events for governments to share progress on their national jaguar plans and discuss strategies for advancing the Roadmap, including accessing funding from the GEF.



6

6 priority landscapes for lions, jaguars and snow leopards are slated for protection under the first phase of the **LIVING WITH BIG CATS INITIATIVE**, an initiative co-designed by Panthera and WWF under a newly launched partnership. Living with Big Cats seeks to minimize the threats big cats face and protect the crucial biodiversity that exists within their landscapes through actively engaging local communities, based on the principles of equality, inclusion, mutual trust, and capacity building. The partnership will bring a people-centric perspective to addressing conflict by reducing the costs of living with cats; increasing the value of living with big cats; promoting healthy and connected habitats, and advocating for policy change.

2034

2034 is the next Year of the Tiger. Panthera and tiger conservation practitioners from numerous organizations and disciplines came together alongside the Global Tiger Initiative to support the 13 tiger range countries in the development of the Global Tiger Recovery Plan for the next 12-year period. The coalition called upon its combined expertise to publish **“SECURING A VIABLE FUTURE FOR THE TIGER.”** The document outlines an ambitious set of goals and objectives to build upon progress since 2010 to stabilize and increase tiger populations and expand their range. The coalition also began work on a plan to mobilize funding and capacity to help range countries sustainably implement their national strategies and facilitate tiger conservation range-wide.



Investing in the Next Generation

PANTHERA'S GRANT PROGRAMS

WINSTON COBB MEMORIAL FELLOWSHIP

Supports field-based internships for early-career conservationists on projects led by Panthera or partners

Charina Pria Sivayogam
Bryan George
Panthera Malaysia

KAPLAN GRADUATE AWARDS

Supports biology graduate students working on all wild felids, with a particular focus on threatened species

William Connor O'Malley
Predicting mountain lion resource selection and abundance in North America

Siria Gámez
Cats, Cattle, and Coffee: understanding the drivers of vertical space use in the Neotropical felid guild of Chiapas, Mexico

Kitichaya Penchart
Genetic characterization of captive Thai leopards (*Panthera pardus*) for conservation and forensic studies

Matthew Hyde
Mapping retaliation in a landscape of impunity: Jaguars in the Colombian Llanos

Vitor Emanuel Chaves Moura
Small cats in Brazil's agricultural frontier: spatial ecology of the northern tiger cat (*Leopardus tigrinus*) and other small felids in the vanishing Cerrado savannas

Ntongwe Peter Kome
Biomonitoring and Community Engagements for the Conservation of the Endangered Leopards in the Dja Faunal Reserve, Cameroon

Fleur Visser
The conservation of the critically endangered lion (*Panthera leo*) of West Africa: population status and management recommendations

SMALL CAT ACTION FUND (SCAF)

Supports conservation and research on many of the 33 small cat species

Amanda Wilson
Ecology of small sympatric felids in the fragmented landscape of the Kinabatangan Wildlife Sanctuary

Michael Levin
Conserving Power: How Solar Energy Infrastructure Affects Bobcat Movement in North Carolina

Flavia Pereira Tirelli
How wild small cats are coexisting in a world's hotspot of felid biodiversity

Olivia Feldman
Integrating Socioecological and Behavioral Methods to Evaluate Carnivore-Livestock Conflict: Geoffrey's Cats in Patagonian Ranchland

Pablo Cisneros Araujo
Study of the dispersal of wild-born Iberian lynxes to improve connectivity management

Tadeu G. de Oliveira
Range-wide threat mitigation, population monitoring and assessment of the tiger cats' species complex (*Leopardus tigrinus/guttulus*) in their key conservation areas in South America: a Tiger Cats Conservation Initiative proposal

Dipendra Adhikari
Strengthening conservation initiatives and securing the future of Rusty-spotted Cat in Western Terai Landscape, Nepal

Kimberly Craighead
A population assessment of margays (*Leopardus wiedii*) living on the edge in the Nargana Wildlands

Dr Julia Chase (Fernando Potess) Grey
Establishing population density and threats to the Sunda Clouded Leopard from illegal hunting of leopards and their prey, Northern Sumatra, Indonesia.

Torrey Rodgers
Investigation of Central American onchilla distribution, population, conservation, and taxonomic status

Michelle Marie Schroeder
The application of scat detection dogs and Fecal DNA for Black-Footed Cat (*Felis nigripes*) research

Buyandelger Suuri
Assessing Pallas's cat density using camera trap data in the eastern Mongolian steppe

Phub Dorji
Small Wild Cat Conservation through local community participation in Biological Corridor 4

Top to bottom: Training young locals to scan for snow leopards in the Dolpo Himalayas; Scat detection dog Lyka Lilly and Panthera grantee Michelle Schroeder in the field in southern Africa; Fatima Mannapbekova and Altynai Adabaeva collecting camera traps in Osh Oblast, Kyrgyzstan.



Amaia Autor Cortés
Assessing the impact of a 70-year-old highway on onchilla's spatial ecology

Divyashree Rana
Surviving in the changing mosaic: Understanding genetic connectivity and its barriers for the Fishing Cat in the Terai Arc Landscape of India

SABIN SNOW LEOPARD GRANT

Supports conservation efforts on the snow leopard in Asia

Munib Khanyari
Putting the "ghosts" of our past behind: Population estimation of snow leopards in Jammu & Kashmir, India

Jaffar Ud Din
Promotion of community-based conservation tourism for snow leopard conservation in northern Pakistan

Gopal Khanal
Estimating population distribution and abundance of snow leopards in Western Landscape Complex, Nepal

Tshiring Lhamu Lama
Training Young Locals for Alternative Livelihood Opportunities in Snow Leopard Viewing in the Dolpa Himalayas

Yonten Jamtsho
Pattern of livestock depredation by snow leopards in northwestern Bhutan

Francesco Rovero
The snow leopard in the Altai-Gobi of Mongolia: assessing occurrence, density, conservation status and patterns of co-occurrence with livestock and wild ungulates

Jiahui Wang
Impacts of human activities on distribution and abundance of snow leopard in eastern Tibetan Plateau: a case study in Mount Bujia

Shahina Aqododova
Strengthening local capacity for snow leopard conservation in Darvaz region of Tajikistan

Fatima Mannapbekova
Building capacity for effective snow leopard conservation in Osh Oblast via camera trapping study and documentary film development





Ways to Give

PLEASE CONSIDER GIVING, SETTING UP A RECURRING DONATION OR INCLUDING PANTHERA IN YOUR ESTATE PLAN TODAY.



Above (left to right): Checking camera traps in Huai Kha Kaeng Wildlife Refuge, Thailand; Panthera field technician Fernando Tortato tracks jaguars using telemetry in the Pantanal, Brazil.

Opposite: Laurel Serieys sets up a box trap in Khao Sam Roi Yot National Park, Thailand.

Wild cats need your help to ensure their long-term survival and the health of their habitats. Panthera has earned the highest ratings from both charity watchdog groups Guidestar (Candid) and Charity Navigator. Your support helps fund our ranger patrols to protect targeted wild cat species; disrupt the illegal wildlife trade and poaching; innovate to combat threats like wildfires, and engage with local communities and indigenous peoples looking to prosper in harmony with wildlife.

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Panthera Corporation is a 501(c)(3) non-profit organization. Your donation is tax-deductible in the United States to the fullest extent of the law.

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- If you are in France, you can make a donation to Panthera France on panthera.org/donate/france.
- For all other countries, please contact us at donate@panthera.org.

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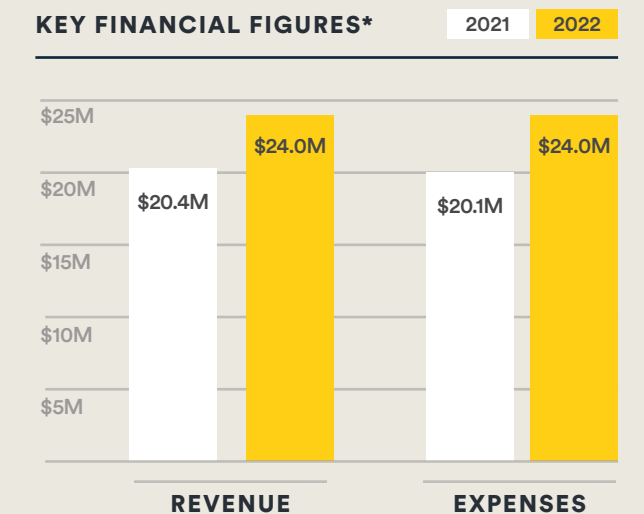
2022 Financial Summary

Panthera made significant progress in 2022 towards ensuring a future for wild cats and the vast landscapes on which they depend. Thanks to our donors' generosity, 2022 was Panthera's biggest financial year ever, continuing a multi-year trend of double-digit percentage growth in revenues and expenses.

Panthera increased operating revenue to \$24 million, an 18 percent increase over 2021 revenue. Organizational expenses grew 19 percent, increasing to \$24 million in 2022. Donor resources have expanded Panthera's investment in conservation efforts globally, as well as capacity building in core operations.

We extend our sincere gratitude to our donors and partners for their trust and support of our mission. Your support advances our vision of a world in which wild cats thrive in healthy landscapes that sustain people and biodiversity. Thank you.

KEY FINANCIAL FIGURES*



* Unaudited numbers

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2022 Director's Meeting team photo in Costa Rica



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