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# Saving the World's Remaining Tigers: Panthera's Work and the Role of Non-Profits in Wildlife Conservation

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**Saving the World's Remaining Tigers:  
Panthera's Work and the Role of Non-Profits  
in Wildlife Conservation**



**John Byrne**

**ENVP 4000**

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## SECTION I: INTRODUCTION

The tiger (*Panthera tigris*) is the largest cat species in the world. Despite its iconic nature and inherent beauty, the tiger is also the most threatened of the big cats. At the turn of the century, it was estimated that roughly 100,000 tigers existed in the wild. Today, that estimate has been reduced to 3,000. This drastic drop in population numbers is the result of three main threats: rampant hunting of tigers, deforestation & loss of natural habitat, and the hunting of various tiger prey species. These threats each have evolved in a complex and site-specific manner that make them difficult to address.

Of the big cats, the plight of the tiger is the most severe. As such, members from the wildlife biology and conservation communities are committed to developing strategies to protect the remnant tiger populations, despite the multitude of obstacles that confront them. Conserving wild tigers is undoubtedly a daunting task, but it is one that has been and will continue to be pursued passionately. Successful wildlife conservation involves a concerted effort between local and national governments, scientists, and various advocacy organizations. Saving the tiger is crucial in addition to various religious and cultural values throughout Asia that are associated with the tiger, it also possesses critical ecological value in terms of maintaining biodiversity. Tigers

are keystone predators, and so a healthy tiger population is indicative of a healthy ecosystem. Furthermore, as charismatic mega-fauna, tigers have the potential of increasing their home countries' GDPs through ecotourism. Seeing a tiger in the wild is something that visitors from around the world continually flock to India and other Asian countries to experience.

This past year, I had the pleasure of interning with Panthera, the world's leading wild cat conservation organization. While they develop projects to protect all 37 species of wild cats, they mainly focus on the four most endangered species – lions, jaguars, snow leopards and tigers. Its uniqueness as an organization comes in the way it combines rigorous scientific analysis with its non-profit fundraising and communication capabilities to hone in on exclusively protecting big cats. Historically, conservation has been a soft science, promoting education and awareness while often lacking accurate population metrics and ecological analysis. By setting benchmarks and utilizing hard science, Panthera's programs have raised the bar for big cat conservation efforts and are demonstrative of the organization's trailblazing nature. Its small size, newness, flexibility and commitment to saving big cats make it an effective force in the world of wildlife conservation. In spearheading and leading the most crucial efforts to protect big cats, Panthera's work is redefining the role of non-profits in wildlife conservation.

This report will examine the conservation status of the tiger and measures that have been taken to protect wild populations. A discussion of its ecology and behavior is included to convey the variety of needs that are associated with establishing areas that can sustain viable populations. A look at the main threats that tigers face is crucial to understanding the conservation strategies that should be employed, and so these points will also be addressed. Focal to the report, however, will be the efforts of Panthera and its emergence onto the conservation scene as an organization that can be considered the first of its kind. Their flagship program for tigers, called ‘Tigers Forever’, epitomizes their uniqueness and effectiveness as a conservation-based non-profit and will be used as the case study for evaluating their work.

The main disciplines examined in this report are conservation biology, politics and history. Conservation biology is the scientific study of the earth’s biodiversity. It aims to preserve natural systems throughout the world by protecting species and their habitats from extinction. Like Fordham’s Environmental Policy major, conservation biology is an interdisciplinary approach. Conservation biology addresses the problem of declining biological systems throughout the world. It combines the scientific analysis of biology and ecology with the study of natural resource management and the economics of protecting natural areas. Conservation biology is concerned with the causes behind the loss of biodiversity and how to maintain it moving forward. It is

sometimes referred to as a “discipline with a deadline” because its mission is very time sensitive as species diversity continues to decline rapidly. It is the heart of what Panthera’s field staff does; any analysis of their work is an analysis of the methodologies behind conservation biology.

The history of wildlife conservation, particularly for big cat species such as the tiger, are also discussed in this report to highlight the strides that Panthera has made as a new organization on the scene and to tell the story of conservation as a discipline. Protecting wildlife also involves political dealings with the governments where these species exists and demands cooperation in the form of law enforcement against poaching and other laws involving protected areas. Panthera, in leading conservation efforts for tigers, often has to deal directly with local and national governments throughout Asia, which can often be the most frustrating part of their work.

## **SECTION II: PANTHERA’S STORY**

In 2006, Dr. Thomas Kaplan and his wife Daphne founded Panthera. Although an entrepreneur by profession, the big cats have always been his true love. His enthusiasm for wildlife conservation has led him to not only found Panthera but also to fund Oxford University’s Wildlife Conservation Research Unit, the world’s leading university-based felid conservation project (panthera). His passion for big cats began at a young age; now, he serves as the executive

chairman of Panthera. Panthera's mission is to ensure the future of wild cats through scientific leadership and global conservation action (Panthera.org). The scientists who coordinate Panthera's operations are undoubtedly leaders in their field. Panthera's CEO, Dr. Alan Rabinowitz, is one of conservation's most recognizable figures and the world's leading jaguar and tiger expert. Dubbed 'The Indiana Jones of Wildlife Conservation,' by TIME magazine, Dr. Rabinowitz's extensive work to protect wild places has led to positive press in a variety of outlets, including BBC Nature documentaries and a guest appearance on *The Colbert Report* (Panthera.org). His accomplishments are far ranging, including the establishment of the world's largest tiger reserve in Myanmar as well as conceptualizing the groundbreaking Jaguar Corridor Initiative, which establishes a web of genetic corridors for jaguars to be able to move across throughout their entire range from Mexico to Argentina.

Panthera's President is Dr. Luke Hunter, one of the most published and well-regarded cat conservationists in the world. He oversees all of Panthera's cat conservation programs throughout the world and previously ran Wildlife Conservation Society's Great Cats program. Dr. Rabinowitz's mentor, Dr. George Schaller, serves as one of Panthera's Vice Presidents. Considered one of the founding fathers in the field of wildlife conservation, Dr. Schaller simultaneously holds the position of Senior Conservationist for the Wildlife Conservation Society. Andrea Heydlauff also serves as Panthera's Vice



President. Previously the Tiger Program Coordinator at the Wildlife Conservation Society, Andrea oversees the operational aspects of Panthera, including communications, outreach, media projects, as well as donor and partner relations. She is able to combine her passion for big cats with her background in writing and education to increase Panthera's effectiveness as a public charity. Additionally, Panthera employs the highest caliber of scientific teams to implement their conservation strategies at the sites where help is needed most.

In giving the backgrounds of the people at Panthera, I am trying to illustrate the excellence and quality of the type of work that the organization is capable of. This star-studded cast of conservation experts work cohesively to achieve Panthera's mission and their dedication to big cats has had far reaching impacts, which is particularly impressive considering how recently the organization was founded. My position with Panthera is within the Media and Communications department, where I have been exposed to the strategic mechanisms of public outreach for non-profits in order to garner more attention and aid to the cause. Much of what I have worked on has involved Panthera's social media platforms and overall web presence. Steve Winter, one of the most renowned wildlife photographers in the world, is Panthera's media director. Photos from him and other skilled photographers that Panthera is in collaboration with are sent into the New York headquarters. Part of my job is

adjusting these photos and editing them for use on Panthera's website and social media outlets. The big cats are breathtaking to see, especially within their natural habitats. Animal lovers and members of the wildlife community visit Panthera's Facebook page and blogs to receive updates on Panthera's work and to catch a glimpse of some of the beautiful photos that I am privy to.

These photos and anecdotes, while seemingly playful in nature, are an integral part of Panthera's communications strategy. By matching their mission to the face of an adorable tiger cub, Panthera is able to evoke the wonder and sympathy of anyone who happens to view these images. In doing so, Panthera strengthens its mission by delivering a tangible form of connectivity between its supporters and the animals they care about. Additionally, the creativity and appeal of Panthera's online presence increases its popularity as a non-profit organization, attracting potential donors and heightening awareness for the plight of big cats.

My work with Panthera is thoroughly enjoyable but admittedly miniscule in the scope of what the organization has been able to accomplish. Since its birth in 2006, Panthera has been committed to saving all 37 species of wild cats across their home ranges. In its brief time as an organization, Panthera has strategically utilized financial and intellectual capital to conquer the hurdles that stand in the way of wild felid conservation.

Panthera's Tigers Forever program, which will be discussed at length in the next section, is a prime example of the cutting-edge type of conservation projects that are characteristic of its work for all of the imperiled species of big cats. This excellence, however, is not exclusive to Tigers Forever and is represented in all of Panthera's ventures to save big cats. Dr. Alan Rabinowitz, one of the pioneering forces in studying the elusive jaguar in its natural habitat, spearheaded what has now become Panthera's Jaguar Corridor Initiative. This program, through thorough scientific analysis and comprehensive consideration of nation-specific politics and government systems, seeks to establish genetic pathways for disparate populations of jaguars to encounter each other and boost the overall number of jaguars in the wild. True to Panthera's nature, the project is ambitious; the Jaguar Corridor Initiative has mapped genetic corridors throughout the jaguar's entire range, stretching from Argentina to the northern tip of Mexico (Panthera.org). Dr. Rabinowitz's work has led to multiple South and Central American countries signing MOU's (memorandums of understanding) supporting efforts to preserve remaining jaguar populations.

While all of the aforementioned major players in Panthera's global scheme such as Dr. Rabinowitz are world-renowned for their work, virtually every one of their species directors and field biologists are the supreme authorities on their subject of study. These men and women harness strategic

partnerships with Non-Government Organizations, local scientists, governments and local authorities to promote the well being of each area's species of wild cat in a scientifically rigorous and sustainable manner.

Panthera's Munyawana Leopard Project demonstrates the organization's ability to combine scientific expertise with sound communication, education and outreach. While leopards are not the most besieged of the big cats, they do still face the typical threats of poaching and habitat reduction throughout their home ranges. The Shembe Baptist Church of South Africa has adopted the Zulu tribe's tradition of using animal skins in ceremonious activities, particularly those of the leopard. As the religion has a very large following, continued killing of leopards for this purpose only compounds the difficulties to maintain a healthy number of cats in the wild. Therefore, Tristan Dickerson, one of the leaders of the Munyawana Leopard Project, has devised a faux leopard fur program in an attempt to quell the demand for leopard skins in Shembe ceremonies (Panthera.org). The venture has been successful through collaborations with clothing companies and digital designers to develop high-quality, affordable faux leopard skins that Tristan has been promoting to Shembe church leaders.

For the conservation of all big cats, one of the most important facets of any organization's work is the mitigation of human-animal conflicts. Panthera's partnership with the Kenyan-based Lion Guardians program epitomizes their

ability to do just that. The program trains illiterate Masaai warriors, men who have historically been involved in lion hunting, to turn their efforts rather to protecting the king of beasts. These warriors become first responders in reducing human-lion conflicts by informing herders of areas occupied by lions, helping farmers look after their cattle while tracking down lost livestock. Additionally, the Lion Guardians educate local people about lion conservation to discourage lion hunting in the future (Panthera.org).

Panthera has also developed equally dedicated projects to the conservation of snow leopards, cougars, and the last remnant populations of Iranian cheetahs. While its focus remains on these mega-fauna, it has also given much support to the conservation of small cat species. Panthera's Small Cat Action Fund is a grants program established in partnership with the IUCN Cat Specialist Group to give financial support for graduate or doctoral students conducting research on small cat species (Panthera.org).

These brief descriptions of Panthera's work only scratch the surface of what conservation organizations are truly doing behind the scenes, but they speak to the organization's versatility and understanding of the specific needs for different regions that possess viable populations of big cats. In an interview with Panthera's Vice President, Andrea Heydlauff, she spoke to me about the things that set Panthera apart from traditional conservation efforts. She said that Panthera's newness and smallness give it an edge in terms of flexibility in

tackling multiple projects. For example, Panthera's work to protect tigers is part of a partnership with over 13 institutions, a number almost unheard of for other conservation ventures. Whereas certain organizations may be tied down to protecting specific historical sites or areas that governments deem valuable, Panthera is able to determine what sites throughout tiger range that can support viable populations need the most help and they can begin to forge new partnerships or reinvigorate lasting ones in order to work towards the common goal of protecting tigers. Panthera's unique mission to protecting only big cats, in addition to its esteemed reputation and team of experts give it this ability to approach the threats facing tigers in a more comprehensive and science-based manner.

### **SECTION III: ECOLOGY OF THE TIGER**

Tigers are exclusively an Asian species and once roamed an expansive home range throughout the continent. These iconic big cats are now extinct from 93% of their home range and currently exist within 13 Asian countries: India, Nepal, Bangladesh, Bhutan, Thailand, Cambodia, Myanmar, Indonesia, Malaysia, China, Russia, Vietnam and Lao PDR (Mills, 119). There were originally nine subspecies of tigers, but three of these have gone extinct in the last 80 years. The remaining subspecies are the Bengal, Indochinese, Sumatran, Malayan, Amur and South China subspecies. The three subspecies that have gone extinct are the Javan, Caspian and Bali subspecies.

Tigers are sexually dimorphic, meaning that males and females are phenotypically different. Males are notably larger in size than their female counterparts, have more pronounced whiskers and have a larger paw size which helps scientists to determine the sex of a tiger when examining its tracks. The most distinct characteristics for all tigers, though, are their orange/reddish fur with black vertical stripes and light underbellies. The stripes serve as camouflage in the wild – as a tiger walks through forest understory and grass stems, the stripes disappear among the foliage and make it virtually invisible to prey or the naked human eye (Mills, 11).

Four of the five remaining tiger subspecies exhibit what is known as a morphological cline. This occurs when a single species gradually begins to look different over its geographical distribution as a result of adapting to varying climates and habitats. For tigers, the cline reveals that subspecies decrease in size and have darker stripe coloration the further south their range extends. For example, the Amur tiger of Siberia has the lightest fur and stripe color with a white underbelly and is the largest of all subspecies. It has evolved this way to make it a successful predator in the snowy temperate boreal and coniferous forests of eastern Russia. The Sumatran tiger, on the other hand, is the smallest of the tiger subspecies and has the darkest fur and stripe color, making it an effective hunter in the dense, lush tropical rainforests of Indonesia. Tigers exhibit the largest range in size among any big cat, largely due to their cline.

Tigers exist in a variety of habitats. They can be found in subtropical forests in China, Nepal, Bhutan and India; mangrove forests in India and Bangladesh; alluvial grasslands in India and Nepal; and tropical wet-evergreen, moist-deciduous and dry-deciduous forests all over tropical Asia, in addition to the temperate boreal and coniferous forests in Siberia (Karanth & Nichols, 15).

Tigers are classified into four age classes or demographics: cubs (less than a year old), juveniles (1-2 years old), transient floaters (tigers over 2 years of age without stable home ranges), and resident breeders (tigers over 2 years of age that maintain home ranges and reproduce). Tiger society revolves around breeding females. Tigresses establish a home range when they begin breeding, usually around 3-4 years of age. These home ranges remain relatively unchanging while they raise their cubs, and tigresses tend to hold these locations for about 5-7 years until a younger, more competitive female comes in and takes over.

During the tigress' stay in her home range, and under favorable ecological conditions, she will typically produce a litter of 3-4 cubs every 2-3 years (Karanth & Nichols, 12). However, the cubs' chances of survival are limited—starvation, floods, forest fires, other predator species and human persecution lead to high death rates among cubs. Tigresses raise the cubs alone, and generally speaking, tigers and tigresses lead solitary lives except for short periods of time during breeding (Stracey, 34). It is in the best interest of



the mother to keep her cubs away from other tigers, for new adult males will try to kill the cubs of the breeder whom he replaced in a preemptive attempt to eliminate the potential of the cubs growing and posing a challenge to the reign of their newly established territory. Additionally, adult males appear to only tolerate their own offspring during occasional encounters (Karanth & Nichols, 13).

Tiger mothers force their juveniles out of their home ranges when these young ones have reached 18-24 months age. Now considered transient floaters, these tigers will move over vast distances (primarily at night) and through several breeder territories looking for places to settle down. Females will be looking for a home range of their own to establish and begin breeding. Males, on the other hand, establish larger ranges that overlap the ranges of several breeding females. Breeding males' tenure is shorter than the females, last approximately 2-4 years (Karanth & Nichols, 12).

As solitary carnivores with large ranges, tigers exist in the wild in very low densities. This makes monitoring them difficult, but scientists have come to understand that one of the most important ecological determinants for whether or not an area supports a healthy tiger population is the abundance of prey species. The tiger's prey must be large; even if there is an abundance of small mammals to hunt, tigers cannot attain high population densities in the absence of enough ungulate (hoofed) prey (Karanth & Nichols, 12). There is a strong

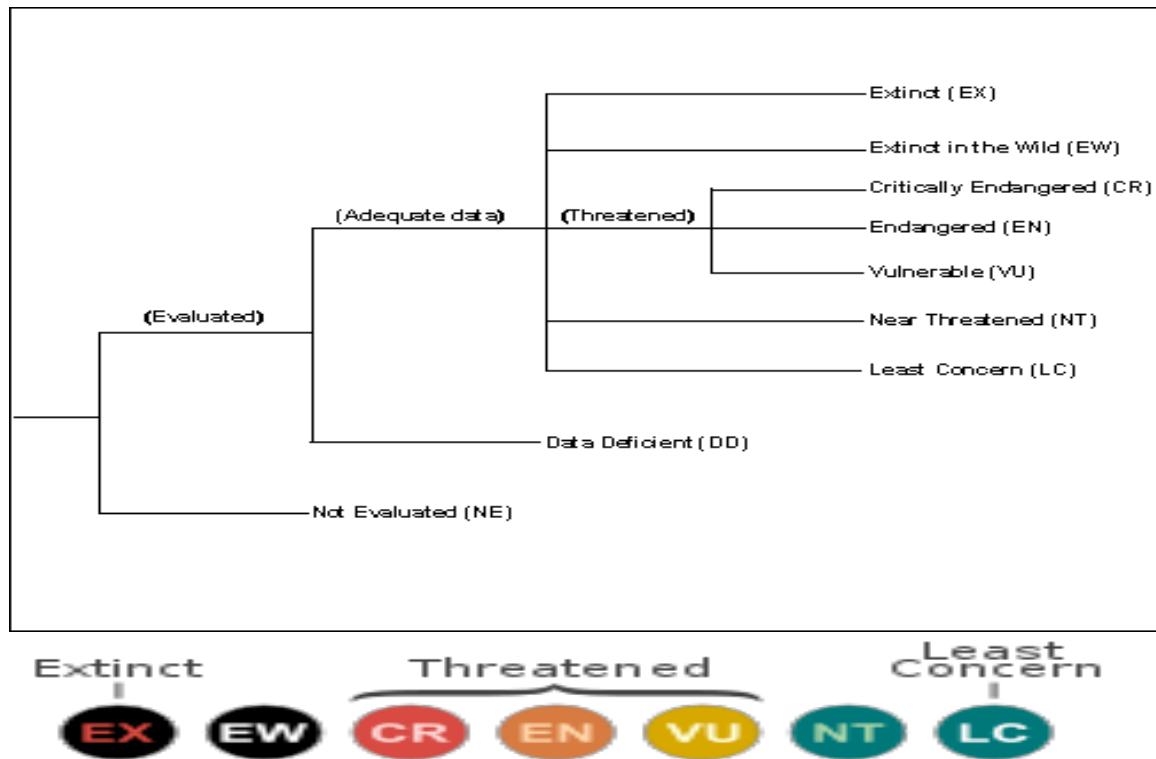
correlation between prey abundance and tiger densities. As prey declines, breeding females have to expand their home ranges. Since they are intolerant of any other breeding females in their area, this expansion reduces the number of such females that an area can support. Less breeding females translates to lower population density overall. Prey abundance also increases survival rates for cubs and juveniles. Additionally, prey abundance also gives an area the capability to support higher numbers of transient floaters, so prey density is essential to supporting healthy tiger populations.

Understanding tiger ecology is necessary to implement effective conservation strategies. Tigers are more difficult to monitor in than other species for a number of reasons. Whereas a pride of lions on the plains of Africa may be more habituated to seeing convoys of tourists on safaris and other teams of researchers, tigers are shy and avoid human contact. They prefer dense cover to aid in stalking prey, which, when coupled with the striping camouflage, makes tiger sightings in the wild a rare occurrence. Their ranging habits are mostly nocturnal and cover massive stretches of land. Their tracks, scent marks, scrape marks, scat and vocalizations are all signs that researchers use to monitor tigers, but due to their extensive ranging behaviors, these signs may be widely separated within very short weeks, making it difficult to detect patterns of movement. Lastly, as mentioned before, tigers exist in very low population densities. Even with high prey density, there may

be as few as 10-20 tigers/100 km<sup>2</sup> (Karanth & Nichols, 16). As monitoring tigers is key to understanding the success of conservation efforts, Panthera has made improving monitoring one of their highest priorities in their efforts to save the tiger. Their team of experts is well versed in the ecology of the tiger and is at the forefront of researching better methods to track and estimate populations in the wild.

#### **SECTION IV: THREATS TO SURVIVAL**

The International Union for the Conservation of Nature (IUCN) is the foremost authority on the conservation status of species worldwide. In 1994, it developed the IUCN Red List of Threatened Species, the most comprehensive global approach for evaluating the conservation status of plant and animal species. The list categorizes the conservation status of a species based on assessments performed through the IUCN in partnership with various scientific and conservation organizations. These categories have become part integral parts of the language of conservation, as members of the wildlife biology community and animal enthusiasts alike have come to recognize them as the reference point for understanding the status of a species' future in the world. The IUCN has diagrammed these categories, featured below:



The tiger is listed as Endangered (EN) according to the IUCN Red List. Just shy of the most threatened category available for species still existing in the wild, the tiger has understandably been the focus of many conservation efforts. One of the fundamental processes for these conservation efforts is developing an understanding of the various threats the species faces and ranking these threats in order of priority.

In the case of the tiger, the most pressing threat has always been direct hunting. Tigers are hunted to feed the demand of illegal wildlife trading networks. Traditional Chinese medicine uses ground tiger bone as a painkiller and Western scientific techniques have proven that tiger bones have anti-inflammatory capabilities (Mills, 125). While the bones are the most valuable

tiger body part, ancient Eastern medicine also ascribes significant value to virtually every component of the tiger's anatomy. In India, tiger fat is considered a cure for leprosy while the claws are used as a sedative in Laos. Whiskers are used for treating toothaches, the blood is taken as a tonic, the tail is used for skin diseases, and the eyeballs for convulsions and cataracts. With such value associated with its body parts, it is estimated that the total value of a tiger on the black market is around \$15,000 (Mills, 125).

Consequently, hunting tigers is a very lucrative undertaking and difficult to discourage when considering how profitable it can be. The demand for these parts has also been consistently large – the illegal smuggling of parts became an epidemic the early 1980's and has remained one of the major threats to tigers ever since. There is a growing middle class in China and Chinese communities throughout Southeast Asia that can actually afford these parts, so as long as this market exists, tigers will be persecuted. There are some who have proposed that this demand can be met through farming tigers for their parts while leaving wild tigers alone, but according to Andrea Heydlauff, Panthera's Vice President, the numbers simply do not add up. The demand for parts is too large to be met with tiger farms and the costs of keeping these animals in captivity (food, healthcare, maintenance) would not be matched by the profit of selling the parts (Heydlauff, 2013). Furthermore, the people who consume tiger parts for medicinal uses consider wild tigers to be better sources of healing, so

the introduction of farmed tiger parts would not be effective as there would still be a high demand for wild tigers. If the numbers did add up and tiger farms made economic sense, Heydlauff said that it an option that would potentially be explored as a way to reduce the poaching of wild tigers. As of now, however, it is not an idea supported by conservationists (Heydlauff, 2013)

It is currently illegal to trade or consumer tiger parts in China, yet there are groups who would like to see these bans lifted to feed the demand. Their ambitions are unrealistic, however, for there is not enough supply of wild tigers to match the demand for their parts, especially if it became legal to participate in this trading network.

In addition to poaching, local villagers and farmers will kill tigers either in retaliation for predation on their livestock sources or as a preventative measure based out of fear. One facet of conservation work is mitigating human-animal conflict to maintain the safety of both parties. Building predator-proof livestock enclosures, training dogs to be aware of a tiger's presence and encouraging villagers stay inside after dark are some ways that conservation organizations attempt to resolve these conflicts.

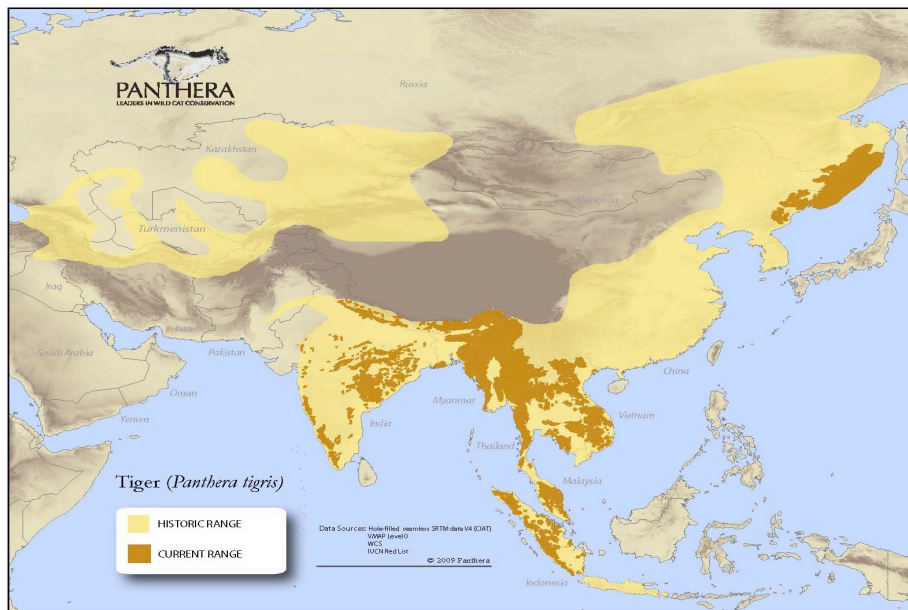
Furthermore, tiger prey species such as deer and wild pig are overhunted. As mentioned before, prey density is the most important ecological determinant for a healthy presence of tigers. Taking away tigers' food sources

decimates wild populations. The extinction of the Bali, Javan and Caspian subspecies gives evidence to the widespread destruction that prey depletion can have. For the Caspian tiger, the nail in the coffin was the poisoning of the boar population that occurred after the reed beds in the area were converted to paddy fields (Mills, 127). The tigers' adapted to living in these fragmented sections of reed beds after their forests had been destroyed and they would seek out boar as their main food source. Neither habitat destruction nor hunting was the culprit in the extinction of the Caspian subspecies – it was prey depletion. The same thing happened for the Bali subspecies. In Java, the wild boar population was poisoned to protect newly established teak plantations. When tigers disappeared from here, it was originally believed that this was due to habitat loss. However, a sample from the last tiger scats collected contained the remains of mongooses, porcupines, a bird and a palm civet – food that cannot sustain a population of tigers. For the Javan subspecies, the lack of ungulate prey also was the leading factor contributing to their extinction (Mills, 128). As these prey species continue to be depleted, the outlook for tigers is bleak. Additionally, human-tiger conflict becomes more prevalent as tigers must seek whatever food available – i.e. cattle, dogs, or other animals directly linked to the wellbeing of surrounding human populations.

The last main threat to wild tiger survival is the depletion of natural tiger habitat. Slash and burn agriculture, the development of palm oil plantations, a

demand for exotic timber and many other factors are contributing to the destruction of millions of acres crucial to tigers and their prey species. Compounded by a growing human population throughout tiger range, the remaining tiger habitats are fragmented and isolated, giving tigers no chance to roam across territories and enhance populations through genetic diversity.

Featured below is Panthera's custom map of historic tiger range as compared to the current range. Evident in the map is the extreme depletion of tiger habitat. Also evident is the fragmented nature of areas that can still sustain tiger populations. As these threats grow, the range will only continue to shrink.



## SECTION V: HISTORY & POLITICS OF TIGER CONSERVATION

Beautiful and charismatic, the tiger is the embodiment of wild places and things. Asian countries began investing millions of dollars in tiger conservation



efforts once their critical status began to grab worldwide attention. However, the fight to protect tigers is fraught with difficulties and complications because it affects a broad range of interest groups, stakeholders, governments and cultures while at the same time assigning a certain value to tigers that not all people may agree with.

Hunters and naturalists have recorded various anecdotal accounts of tigers in the last two centuries, and although qualitative in nature, they laid the groundwork for future scientific analysis of tiger populations (Karanth & Nichols, 9). The first instance of tiger studies based in quantitative biology were conducted by Panthera's Vice President, Dr. George Schaller, in 1967. In *The Deer and the Tiger*, he set out to report on the ecology and behavior of the Bengal tiger and five large ungulate (hoofed) mammals that serve as tiger prey. His study area was an undisturbed forest area in the Kanha National Park in the state of Madhya Pradesh, located in central India (Schaller, 8). His pioneering venture would become a manuscript for future wildlife biology assessments as he gave detailed accounts on the study locations, methods, geographical/ecological distribution, population dynamics and behavior of over ten species of Indian wildlife. Human and animal ecology are intimately related in India as villages and communities exist on the edge of rich forests, so a thorough biological understanding of its wild places was necessary to develop effective conservation and management strategies.

In the introduction, Dr. Schaller closes with: “If this report acts as a stimulus for other studies it will have served its purpose” (Schaller, 9). The report did exactly that, and his research sparked an interest in the scientific community that had come to realize how little was known about predator-prey relations, population dynamics and many other ecological factors that can determine the viability of ecosystems containing valuable flora and fauna throughout Asia. *The Deer and the Tiger* revealed the world of a very specific ecosystem within one region of India. As mentioned before, tigers exist in a variety of habitats, each with its own story. Work like Dr. Schaller’s became increasingly valuable in the world of wildlife conservation.

The first large-scale conservation effort devoted to tigers and their habitats was ‘Project Tiger,’ launched in 1973 by the Indian government. It came as the result of research conducted after Prime Minister Indira Gandhi banned tiger hunting and the sale of tiger skins in 1970. This made India the first country to legally protect tigers (Mills, 123). The government then set out to do a nationwide survey of tiger populations. At the turn of the 19th century, it was estimated that 40,000 tigers existed in the wild of India. After the survey initiated in 1972, scientists revealed that only 1,827 tigers remained in the entire country (Projecttiger.nic). Prime Minister Gandhi then established a unique tiger coordinating committee to develop a concrete project that would protect tigers where they had the best chance of surviving throughout the

country. Dubbed “Project Tiger,” it was officially launched in 1973. The project set out to ensure a viable population of tigers in India due to their scientific, economic, aesthetic, cultural and ecological values; it also set out to preserve areas of biological importance as a benefit not only to the tiger but for the natural heritage, education and enjoyment of the people (Projecttiger.nic). The main strategy for attaining these goals was the setting up of 9 tiger reserves that would be regulated and protected through government assistance. The reserves were managed based on the following principles: “1. Elimination of all forms of human exploitation and biotic disturbance from the core area and rationalization of activities in the buffer zone. 2. Restricting the habitat management only to repair the damages done to the eco-system by human and other interferences, so as to facilitate recovery of the eco-system to its natural state. 3. Monitoring the faunal and floral changes over time and carrying out research about wildlife” (Projecttiger.nic).

The project was not only the largest conservation effort for the tiger but also the largest effort that Asia had ever seen. It was funded in part by Indian central/state governments and organizations such as the World Wildlife Fund and IUCN. Ten years after the initial establishment of the reserves, renowned tiger researcher H.S. Panwar wrote an article titled “What To Do When You’ve Succeeded: Project Tiger, Ten Years Later.” In it, he described the positive results of the projects and what the future may have in store. Part of the project

involved the moving of 6,000 villagers from over 40 villages in order to preserve designated habitats (Panwar, 330) Relocating people for conservation work is always a sensitive and difficult issue to address, but according to Panwar, this decision not only improved the tigers' chances but also bettered the life of the people because their livestock and crops no longer faced the threat of wild animals. They were given full rehabilitation facilities, homes and water services, schools as well as the essential components for harvesting the land they were given (Panwar, 335).

The number of tigers increased from 268 in nine reserves in 1972 to 775 in 11 reserves in 1981 (Panwar, 337). Currently, there are 27 Project Tiger reserves in India (Mills, 124). The initial enthusiasm of the government has subsided since the project began, however the establishment of the reserves and the project's prominent status means that efforts to protect tigers on the Indian subcontinent will likely continue and bodes well for the future of the tiger. It should be noted, however, that this article was written just as the demand for tiger parts skyrocketed. The initial success of the project started to diminish with rampant poaching throughout tiger range. Nevertheless, Project Tiger set the stage for other tiger conservation efforts and would influence projects in other countries throughout tiger range.

While the central and state governments in India exhibited encouraging initiatives and cooperation for tiger conservation efforts, not all political

situations in tiger range countries are as welcoming. In fact, India has historically spent much more money and invested more time in tiger conservation than any other international body (Mills, 124). The goal for NGO's, non-profits, scientific foundations or any groups concerned with wildlife conservation when it comes to politics is to foster relationships with local and national governments to ensure that conservation policies are not only put in place but also implemented. In my interview with Andrea Heydlauff, she said that Panthera acknowledges itself in countries where it is working to save tigers as a guest of the country with the sole interest of initiating the protection of wild populations (Heydlauff, 2013).

While many countries may have legal bans on hunting tigers or may have ratified agreements such as CITES (Convention on the International Trade of Endangered Species), the issue is often that these laws and policies have weak enforcement. This disconnect is the result of a combination of lack of awareness among local people about the plight of the tiger with limited efforts to enforce wildlife laws from national and local governments. The areas where tigers are often poached are extremely remote, making them difficult to monitor and regulate for illegal activity. Knowing the political obstacles often involved in making conservation strategies come to fruition, Panthera focuses on finding the sites where tigers have the best chance of survival and pinpointing their efforts to protecting those areas.

## **TIGERS FOREVER & TFP**

Tigers Forever is Panthera's flagship program for the species. All of the following information about the program and its protocol has been synthesized from Panthera's Tigers Forever Protocol brochure in addition to my own understanding of the project and conversations with Panthera's leadership. The program was their response to the continuing decline in tiger numbers despite years of conservation efforts focused on saving them. A group of tiger experts came together, headed by Dr. Alan Rabinowitz, and determined that these efforts were lacking in different areas that made the overall goal unattainable. Tigers Forever recognizes that previous tiger projects have failed to monitor the effectiveness of their success because they were too large in scope. Therefore, the group determined that central to Tigers Forever would be the development of conservation strategies designed to address the most critical threats to tigers with focus on designated sites so as to stimulate the most potential for growth in tiger numbers throughout their entire range. The main stated objective for Tigers Forever became to increase tiger numbers by 50% at key sites over a 10 year period. Thus, the program became the first of its kind, setting real benchmarks and guaranteeing results.

The Tigers Forever Protocol (TFP) is an implementation list developed by Panthera that has become the methodology of the project. While tiger sites throughout tiger range vary greatly in ecology, politics, and culture, TFP is able

to identify the key steps in moving towards the goal of increasing tiger numbers. Firstly, tiger sites with the potential to have increases in tiger and tiger prey numbers are identified. These sites must be critical to the long-term future of wild tigers, have strong governmental support and have existing or potential local ability to enforce poaching laws and conduct scientific research. Furthermore, this core site, which tends to begin relatively small, must be embedded in a larger landscape that has the potential to carry growing and dispersing tiger populations. Once the site has been established, a threats assessment is carried out, determining the specific threats that tigers mostly face in order to understand where conservation efforts need to be focused.

In addressing the lack of scientific monitoring to evaluate the effectiveness of conservation efforts, the next step in TFP is to assess the presence of tiger and prey populations and establishing baseline measures of them through such techniques as camera trapping and occupancy modeling. Camera trapping is a common and non-invasive form of population monitoring for species like the tiger that are difficult to observe in the wild. Two cameras with infrared sensors are paired and secured in areas thought to possess frequent visits by resident tigers. When a tiger walks by, the two images capture its stripe pattern, a pattern as unique to the tiger as the fingerprint is to the human. Scientists can calculate population densities through statistical analysis by counting the number of individual tigers from these stripe patterns as well as the amount of

times these tigers appear. However, Tigers Forever recognized that camera trap technology that was being commercially used was outdated and not capable of giving sufficient data for tiger estimates. Higher quality camera traps were available, however they are exorbitantly expensive and not practical for conservation efforts that are charity-based. Panthera therefore invested in and helped develop new digital camera traps that capture clear images, are lightweight, weather resistant and affordable. These new camera traps are being implemented at all Tigers Forever sites and are increasing the effectiveness of survey tactics.

The next step in TFP is creating interventions that will serve to mitigate the most serious threats to tigers in each respective site. Such interventions include increasing the number and effectiveness of park guard patrols, weapons confiscation and stricter enforcement of poaching laws. Part in parcel with law enforcement is the development of informant networks to investigate and apprehend poachers. By incentivizing information giving for local people, Panthera is not only able to directly address the sources of illegal hunting but also heightens awareness of the importance of conservation, so these activities also have an educational component. Panthera also increases the effectiveness of patrol teams by instructing them on using MIST (Management Information System), a technical tool that can determine the effectiveness of human interventions in wildlife conservation. This technology produces standardized



performance reports and produces a computer-based platform to monitor wildlife activity. MIST also has the ability to map the distribution of illegal activities like poaching, logging and snare setting while at the same time tracking the outcome of patrol efforts and mapping patrol coverage. As direct hunting is the greatest threat to wild tigers, Tigers Forever focuses heavily on enhancing law enforcement capabilities and effectiveness.

Once these steps have been taken, TFP becomes an observational and evaluation tool. Part of its approach is annually monitoring the impact of attempted threat mitigation, such as the number of poaching arrests made, snares confiscated, and encounters with poachers. The most important results, however, are the tiger population surveys. TFP therefore requires annual or biannual monitoring of populations to understand trends of tiger numbers over time. The longevity of threat mitigation and proper implementation is crucial to the success of Tigers Forever because to really say that tiger populations have increased by the metrics Panthera has set, these surveys need to be evaluated over an extended period of time. Year-to-year numbers may not paint an accurate picture of what is actually happening in terms of the amount of breeding females that a site is supporting, so part of TFP is ensuring that these interventions and efforts are sustainable.

Once the site that was originally delineated has been successfully secured, the next process in TFP is developing ways to maintain the larger surrounding

area as a suitable habitat for growing tiger populations. At this point, genetic connectivity between different sites is considered and plans to create corridors linking disparate populations are put into action.

Tigers Forever is a pioneering conservation venture. What sets it apart from other tiger protection efforts is its focus on the most critical threats, its accountability in setting quantitative benchmarks, and the underlying principle that every effort involved in the program is results driven. It is indicative of Panthera's trailblazing nature as a figure in the conservation community and demonstrates their commitment to exclusively protecting the big cats where help is most needed. TFP, while not a detailed manual for on ground interventions, does set out the most important steps for a successful tiger conservation venture. By prioritizing the processes that will provide the best outcomes, TFP is a framework that can be adapted by any tiger project, regardless of whether or not is affiliated with Panthera. Its ability to be a model for other efforts demonstrates the expertise of the members of Panthera's team.

## **CONCLUSION**

When Panthera was founded, its slogan read: "Panthera- Partners in Wild Cat Conservation." Some of the memorabilia I saw in the office, such as old coffee mugs or t-shirts still carried this insignia. That slogan, however, has been abandoned. Now, anything with the organization's brand reads: "Panthera-

Leaders in Wild Cat Conservation” and rightfully so. I think that in updating its title, Panthera reflected the role transformation that it was creating for non-profits in wildlife conservation. Unique to the Panthera is its unquestioned direction and vision in all cat conservation efforts. The first of its kind, Panthera represents the potential transformation for any non-profit wildlife organization from partners to leaders in whatever mission that may be undertaken. Tigers Forever is a clear indicator of their leadership and the paradigms set forth through the Tigers Forever Protocol can and should be adopted by any attempt to save big cats. Panthera’s commitment to hard science in the field is something I think to be a crucial component of their success. Having accountability and setting real benchmarks in their efforts has raised the bar for other conservation efforts.

The plight of the tiger is undoubtedly severe. Threats to its survival in the wild are far ranging and often difficult to monitor. Historically, tigers have been the face of many conservation efforts because of their beauty and charisma as a top predator and recognizable mega-fauna. The big cats, generally speaking, have always been the subjects of awe and fascination from humans. I do not think that there will ever be a decline in interest or passion for saving them, and if anything, it will only grow as the educated world becomes more environmentally conscious. However, action needs to be taken now to mitigate the alarming drop in population numbers.

What Panthera has accomplished in its short time is extraordinary when considering how young it is as an organization. They know where tigers will have the best chances of survival and they know what it takes to boost those populations. By focusing on these specific sites, Panthera can rid itself of the limitations of projects that are too broad in scope and can ensure that wild tigers in these areas will continue to exist. I think the future for this organization can only improve as it gains more popularity and financial support. 100% of its donations go directly to fieldwork, something I did not discuss previously but something that adds to its remarkable nature as a non-profit.

In my time at Panthera and research on tiger conservation, hope was instilled in me that wild tigers are not doomed to extinction, despite how bleak their outlook may appear. With the dedication of Panthera's expert scientific leadership and the development of support networks that believe in the cause, I am optimistic for what is in store for all big cats. Hopefully the conservation models and strategies that Panthera has set forth can inspire similar organizations to rise up for other endangered species of wildlife. My time as an intern there is over, but I hope our paths cross again in the future to protect the world's remaining big cats.

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