Thailand Tiger Action Plan
2010-2022

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Department of National Parks, Wildlife and Plant Conservation
Ministry of Natural Resources and Environment
Thailand

"Turning the tide of extinction of wild Tiger, changing the way we treat the world for our future generations."

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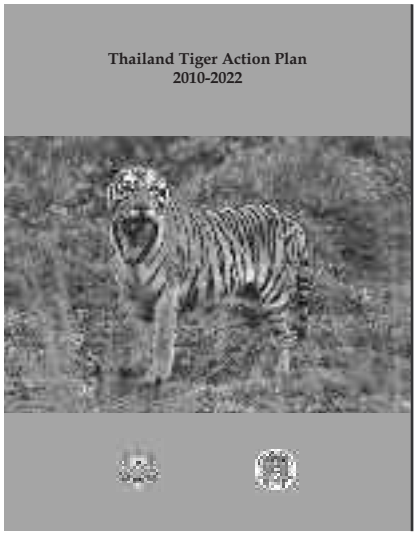

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Female tiger in Huai Kha Khaeng Wildlife Sanctuary.

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Inside front cover double page:

Tiger in Huai Kha Khaeng Wildlife Sanctuary.

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Inside back cover double page:

Tiger with a gaur killed in Huai Kha Khaeng Wildlife Sanctuary.

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ABBREVIATIONS AND ACRONYMS

ASEAN-WEN	ASEAN Wildlife Enforcement Network
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CC	Community Committee
DNP	Department of National Parks, Wildlife and Plant Conservation
DP-KY	Dong Phayayen – Khao Yai Forest Complex
GEF-5	Global Environment Facility for Biodiversity
GPS	Global Positioning System
GTI	Global Tiger Initiative
HKK	Huai Kha Khaeng Wildlife Sanctuary
HKK-TY	Huai Kha Khaeng and Thung Yai Narasuan Wildlife Sanctuaries
IUCN	International Union for Conservation of Nature
KNR	Khao Nang Rum Wildlife Research Station
KY-TL	Khao Yai and Thap Lan National Park
MIST	Spatial Management Information System
MoU	Memorandum of Understanding
NGOs	Non Government Organizations
NP	National Park
NTFPs	Non Timber Forest Products
PAAO	Protected Area Administration Office
PAC	Protected Area Committee
PAs	Protected Areas
REDD	Reducing Emissions from Deforestation and Forest Degradation in developing countries.
Smart Patrol System	The implementation of a suite of components necessary for effective law enforcement including strategic planning, adequate training and staffing levels, equipment and other resource needs, standardized law enforcement monitoring potocols, and full integration of law enforcement monitoring data into the adaptive management cycle.
Tenasserim-WEFCOM	Tenasserim-Western Forest Complex
Thailand-WEN	Thailand Wildlife Enforcement Network
WCS	Wildlife Conservation Society
WEFCOM	Western Forest Complex
WS	Wildlife Sanctuary
WWF	World Wild Fund for Nature

Message from His Excellency Mr.Abhisit Vejjajiva, Prime Minister of the Kingdom of Thailand

This year is the year of tigers. We all reconise that tigers face a very real threat of extinction as a result of a variety of factors ranging from habitat loss and prey depletion to poaching. This is a challenge not only for tigers but also for biodiversity conservation and for human welfare – a challenge coming from our misperception in the past, that nature's bounty is unlimited and thus can be freely exploited. Now we know that nature is not limiless, and both tigers and humans suffer if free and unlimited exploitation is allowed to continue.

In January 2010, Thailand hosted the 1st Asia Ministerial Conference to strengthen political will on tiger conservation and help political leaders from tiger range countries define bold programs to avert the threat of extinction. The Royal Thai Government fully support the recovery of this threatened species through the development of smart infrastructure and land use, empowerment of communities in and around tiger landscapes, improvement of wildlife law enforcement and governance, building professional capacity, and seeking innovative financing for tiger conservation. Thailand has incorporated all these commitments into our new National Tiger Action Plan, and we are confident that it will contribute to regional and global efforts to conserve the tiger.

As we work together to accomplish this important task, we will be remembered as part of a generation that championed, protected, and initiatrd the conservation of tigers and our entire global natural capital that is part of our planet's life-supporting system.

Thailand looks forward to working with our neighbours and the international community to achieve this goal. The wild tiger is already in crisis – this may be our last chance to save it.

(Abhisit Vejjajiva)
Prime Minister of the Kingdom of Thailand

FORWARD

Tigers are not only incredibly magnificent creatures and important icons of our national and regional Asian heritage but are also essential parts of our forest ecosystem. A loss of wild tigers is a barometer for the health of ecosystem across the region. Nevertheless, tigers are currently under a serious threat of extinction due to an increase of poaching, habitat loss, and prey depletion which adversely affects the whole ecosystem. On the verge of extinction, tiger conservation has gained a momentum in Thailand since the last decade. In 2004, during my first tenure as the Minister of Natural Resources and Environment, Thailand launched the first Tiger Action Plan that government agencies and partners have used as the guidance to save the tiger. Since then, Thailand has played a pivotal role and has made several significant developments in tiger conservation. In this regard, the Department of National Parks, Wildlife and Plant Conservation (DNP) has worked closely with international conservation organizations to establish and implement an international standard patrol system, known as the Smart Patrol System, in the core area of Thailand's Western Forest Complex (WEFCOM). The system has become a model to other tiger range countries that are striving toward improving their protection systems for tigers.

On the illicit cross border trade front, Thailand has been a hub for ASEAN Wildlife Enforcement Network (ASEAN-WEN) in order to fight against organized international wildlife crime, including tigers. In January 2010, Thailand proudly hosted the 1st Asia International Ministerial Conference on Tiger Conservation at Hua Hin, Prachuap Khiri Khan province. At this international conference, the Ministry of Natural Resources and Environment initiated the establishment of the Regional Tiger Conservation and Research Centre at Huai Kha Khaeng Wildlife Sanctuary, the core area of WEFCOM. The Thai models against tiger extinction have provided vital experiences and knowledge exchange to other neighbouring countries for rebuilding tiger populations.

As saving wild tiger is at the very heart of the conservation and biodiversity agenda, I would like to present Thailand's new Tiger Action Plan. With dedication, determination, and collaboration, I am strongly convinced that Thailand will succeed the goal of doubling the wild tiger population by the next Year of the Tiger in 2022. Finally, I would like to thank the hard work and collaborative support from an alliance of governments, international organizations, civil society, and other dedicated partners which significantly help Thailand averting the threat of tiger extinction and contributing to global tiger conservation.

(Suwit Khunkitti)
Minister of Natural Resources and Environment

FORWARD

Thailand is one of the fast growing economies in Southeast Asia. The trade-off, however, is that the current forest cover is 28% of the country area, which is among the lowest in the region. Fortunately, Thailand began establishing wildlife and national park laws and a protected area system almost 50 years ago. The current protected area system covers about 18% of the country area, and the Thai government has already invested in establishment and running of 123 national parks and 58 wildlife sanctuaries. Besides protection of landscapes and their depending wildlife species, the government also undertakes various interventions including nature education, alternative livelihood, and wildlife crime suppression.

Despite the significant efforts and investments, the recent rigorous monitoring systems have revealed that wild tigers are surviving in recoverable numbers only in protected landscapes with a strong history of protection, especially in areas with active park guards and good patrol systems. The on-going intensive population monitoring program has revealed that only one landscape, the Tenasserim-Western Forest Complex (Tenasserim-WEFCOM) can be counted as a "tiger source site". More than 100 adult tigers have been photographed in this landscape over the last 5 years. Tenasserim-WEFCOM is about 25,000 km2 on Thailand's side, and with habitat in Myanmar this is a globally important tiger landscape. The core area is also a world heritage site.

Another landscape that can qualify as a "potential source site" based on camera-trapping evidence is Dong Phayayen–Khao Yai Forest Complex (DP-KY); also a world heritage site. About 8 adult tigers have been photographed from this 6,100 km2 landscape. These two represent the landscapes with the greatest potential for tiger recovery in Thailand.

The success of the 12-year plan of wild tiger recovery is very much dependent on: strengthening landscape-scale conservation interventions in these two landscapes; rigorous research and monitoring; transboundary conservation ties being strengthened to effectively control cross-border trade; and law and policy reforms to support the efforts to reach the vision and goals as stated in the action plan.

Chote Trachu

(Chote Trachu)
Permanent Secretary
Ministry of Natural Resources and Environment
Thailand

PREFACE

As the Director General of the Department of National Parks, Wildlife and Plant Conservation with the main responsibility to protect and manage the nation's natural heritage, especially wildlife and its ecosystem, I am pleased with this new Tiger Action Plan. The new plan will be used effectively as guidance to implement the conservation intervention and monitoring programs to reach the goal of increasing the tiger population by 50 percent in priority landscapes together with other landscapes in Thailand by the next tiger year in 2022.

There are many challenges and threats to the tiger that we have to overcome in order to be successful. The most important threats are poaching of the tiger and their prey in our national parks and wildlife sanctuaries, habitat destruction, and illegal wildlife trade. We must deal with these problems with better tools and approaches. In Thailand, the tiger population only exists in a healthy number in Huai Kha Khaeng and Thung Yai Wildlife Sanctuaries. This is not only because our managers and park rangers have been dedicated and brave in protecting tigers, but also because they have been inventive and adopting new concepts and tools in conservation. It has been clearly proved that science-based conservation and management is a very effective approach to save such an endangered species as tigers. The successful model needs scaling up to the whole Western Forest Complex landscape and other potential tiger landscapes. On the international cooperation front the Department of National Parks, Wildlife and Plant Conservation will continue working with partners to reduce trafficking in international wildlife trade that is threatened tigers and other wildlife in the region.

The Department of National Parks, Wildlife and Plant Conservation stands firm in our duty to protect tigers and other wildlife. We are also pleased to work with local and international partners to implement Thailand Tiger Action Plan. Together, I am strongly convinced that we can save and restore wild tigers and other endangered and threatened wildlife and their habitats for the benefits of our future generations.

(Sunan Arunnopparat)
Director General
Department of National Parks, Wildlife and
Plant Conservation

ACKNOWLEDGMENTS

The Department of National Parks, Wildlife and Plant Conservation wishes to thank government organizations, Non Government Organizations (NGOs), and conservationists who participated in the process of formulating the Tiger Action Plan.

This plan honors the memory of the late Dr. Saksit Treedej, former Permanent Secretary of Ministry of Natural Resources and Environment, for his efforts in developing this plan and his leadership for tiger conservation in Thailand.

For reviewing and commenting on the draft of this action plan, DNP would like to thank the participants from government sectors, universities, NGOs, and civil society who attended the Wildlife Conservation Day meeting at Faculty of Forestry, Kasetsart University, in 2009.

This action plan has been also reviewed and revised through a series of meetings, including the national consultation on National Tiger Recovery Plan. The action plan has benefited greatly from the contributions of the individuals who participated in the national consultation process.

DNP acknowledges the contribution made by many individuals and is grateful to the following people assisting in the compilation the information, preparation, and publication of this action plan: Dr. Theerapat Prayurasiddhi, Deputy Director General, Royal Forest Department, Mr. Chatchawan Pisdamkham, Director of Wildlife Conservation Office, Dr. Ronasit Maneesai, Dr. Saksit Simcharoen, Dr. Dave Smith, Ms. Belinda Steward Cox, Mrs. Achara Simcharoen, Mr. Somphot Duangchantrasiri, Dr. Rungnapar Pattanavibool, Mr. Sompoch Maneerat, Ms. Peeranuch Dulkul Kappelle, Ms. Umpornpimon Prayoon, Mr Supagit Vinitpornsawan, Dr. Prateep Duengkae, Dr. Nantachai Pongpattananurak, Dr. Narit Bhumpakphan, Dr Vijak Chimchome, Dr. Sompoad Srikosamatara, Ms. Mayuree Umponjan, Ms. Angella Smith, Ms.Waraporn Hirunwatsiri and Dr. Andrey V. Kushlin from the World Bank, Mr.Keshav Varma and Dr. Anand K. Seth from GTI, and Mr. Mahendra K. Shrestha from Save the Tiger Fund. Special thanks also go to Dr. Anak Pattanavibool, Director of WCS Thailand, for the long hours he put into creating the wonderful work found throughout the action plan. Dr. Peter Cutter, WWF coordinator, for his help in compiling comments and put his tireless insistence on developing the initial draft of the action plan, and Ms Budsabong Kanchanasaka, DNP tiger scientist, for her energetic and great effort to formulate this action plan.

Finally, funding for publishing this action plan was generously provided by DNP Wildlife Conservation Office.

EXECUTIVE SUMMARY

Classified as endangered on the IUCN Red List of Threatened Species (IUCN 1996 amended by Cat Specialist Group 2001), the tiger is facing widespread extinction in the near future if poaching, habitat loss, and prey depletion continue. Across its range, a significant number of local populations have gone extinct in the last 25 years and many others are on the verge of extinction. Although tigers in Thailand face similar threats to those in other range countries, tigers still occur within several parts of the country. The largest population occurs in one area near the Thailand/ Myanmar border, the Western Forest Complex, with the highest densities occurring within the Hui Kha Khaeng and Thung Yai Naresuan Wildlife Sanctuaries, Thailand's first Natural World Heritage site. There are two areas where the latest surveys have shown the status of potential source sites. One is the Kaeng Krachan Forest Complex to the south of the Western Forest Complex along the Tenasserim Range next to the Myanmar border. Another is the Dong Phayayen – Khao Yai Forest Complex, also a Natural World Heritage site, near the Cambodian border. The recent country wide surveys for tigers have revealed that tigers occur at very low densities in other parts of the country. After Thailand's first Tiger Action Plan, several important developments with the focus on tiger conservation have happened and become exemplified for the regional and global tiger conservation communities.

In 2004, the Department of National Parks, Wildlife, and Plant Conservation issued Thailand's first official tiger action plan. In the years since then, Thailand has increased tiger conservation efforts and has undertaken more rigorous enforcement, monitoring, and research efforts—especially at the tiger source site in Western Thailand. These efforts include the Smart Patrol System for rigorous patrol and law enforcement monitoring, advanced tiger and prey population monitoring systems as important management response indicators, and increased ecological research to better understand tiger ecology and biology under a Southeast Asian environment. As a result, Thailand is now regarded as a leader in tiger conservation under best practice, science, and policy with much to contribute to the global tiger conservation effort.

Central challenges in the coming years are to (1) ensure that current protection and monitoring systems are sustained in source and potential source sites, (2) expand these systems to cover the whole priority landscapes including the Western Forest Complex – Tenasserim and Dong Phayayen – Khao Yai Forest Complexes, and (3) establish the systems in other sites and landscapes where tigers still occur.

Thailand is pleased to present this twelve year revision of Thailand's National Tiger Action Plan produced in consultation with other government agencies, academics, and non-governmental organizations.

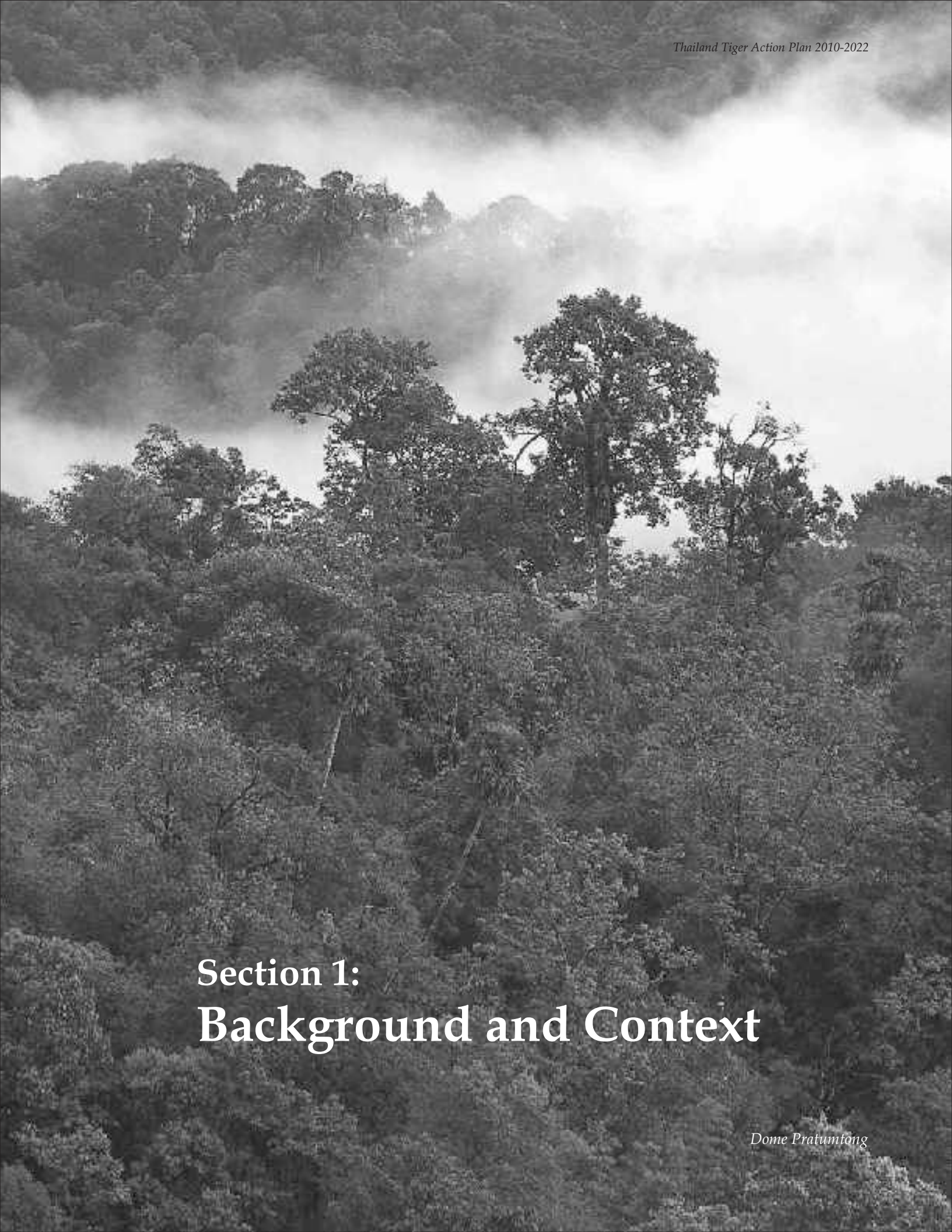
This plan consists of two parts. The first is a review of the ecology and conservation status of tigers in Thailand and a discussion of the conservation challenges that tigers face. The second part is a detailed description of the visions and goals, recommended actions for achieving those goals, details indicators, means of verification, and the anticipated timeframe for each action. This section also details a specific strategy for implementing the plan.

The goals and associated actions for achieving them are arranged under the following five themes:

1) Strengthening direct conservation action and enforcement
2) Building capacity based on successful models
3) Strengthening monitoring, research, and information management
4) Promoting education, awareness, and public participation
5) Strategic financing for tiger conservation.

Accompanying each goal are one or more key points meant to provide the rationale and context for recommended actions.

The success of this plan rests on the effective implementation of the recommended actions through an adaptive management process of periodic evaluation and modification of goals and actions. Adaptive management recognizes that learning is a part of management. To this end, a dedicated Tiger Conservation Committee will be formed and entrusted with ongoing evaluation and implementation of the plan.



Section 1:
Background and Context

Dome Pratumtong

INTRODUCTION

The tiger, *Panthera tigris*, is one of the world's most magnificent animals. Classified as endangered on the IUCN Red List of Threatened species (IUCN 1996 amended by Cat Specialist Group 2001) the tiger faces widespread extinction in the near future if poaching, habitat loss, and prey depletion continue. In the last 25 years, a significant number of populations have gone extinct across the species' range and many others are on the verge of local extinction.

Tigers in Thailand face similar threats to those in other range states and both the range and number of tigers have continued to decline in Thailand due to direct poaching of tigers driven by a thriving illicit commercial wildlife trade, poaching of tiger's prey driven by local demands on wild meat as delicacy, and land encroachment within and around protected areas driven by a mixture of inefficient law enforcement and land use.

However, tigers still occur in many protected areas in different parts of the country. Unfortunately tigers in most areas exist in a vulnerable condition with populations far below a viable level. It is clear that only one landscape stands out as the stronghold of the largest tiger populations in Thailand and, perhaps, Southeast Asia. That landscape is the Western Forest Complex situated along the Tenasserim mountain range, beside the Thailand-Myanmar border. The highest density of tigers are at the core of WEFCOM within the Huai Kha Khaeng and Thung Yai Naresuan Wildlife Sanctuaries (HKK-TY), a Natural World Heritage site.

Since the last Tiger Action Plan published in 2004, important interventions and monitoring of tiger populations have been undertaken in WEFCOM and some other protected areas along the Tenasserim. The government of Thailand, under the leadership of the Department of National Parks, Wildlife and Plant Conservation, and together with other local and international partners, has modernized the patrol and monitoring systems in wildlife sanctuaries and national parks within Tenasserim – WEFCOM landscapes. Such systems have been incorporated into this action plan in the hope of scaling up the systems to safeguard and recover wild tigers in existing and potential tiger landscapes in Thailand.

This plan represents a substantial revision of Thailand's first Tiger Action Plan published in 2004 (Tunhikorn *et al*. 2004). Key additions and changes include:

- Several new goals and actions that make up the heart of the plan
- An explicit specification of a 12 year time horizon for the plan
- Formulation of the plan as a mechanism to provide strategic guidance for tiger
- conservation in Thailand (rather than detailed operational prescriptions)
- A revised "Status of Tigers in Thailand" that reflects recent work to determine the occurrence, relative abundance, and absolute abundance of tigers at the national and site levels
- A call for the formation of a National Tiger Conservation Committee in charged with actively guiding the implementation of the plan via frequent evaluation and detailed annual planning.

The Department of National Parks, Wildlife and Plant Conservation led the revision process with inputs from and consultation with other government agencies, academic institutions, NGOs, and individuals representing the private sector and civil society. Its goal is to inspire a change in the way tiger conservation is viewed in Thailand and to guide the actions of a diverse stakeholder community at a critical time for tiger conservation.

This document consists of two parts. The first reviews the ecology and conservation status of tigers in Thailand and includes a discussion of the conservation challenges facing tigers in Thailand. The second part describes the goals of the plan and recommends actions for achieving those goals.

Actions are divided into the following five themes:

1. Strengthening direct conservation action and enforcement
2. Building capacity based on successful models
3. Strengthening monitoring, research, and information management
4. Promoting education, awareness, and public participation
5. Strategic financing for tiger conservation.

To provide context and rationale for actions, a number of key "Opportunities and Challenges" are identified for each goal.

To be successful, this plan will need significant commitment from a wide range of stakeholders, political resolve from the Thai government, and a renewed interest among Thai citizens.

Why is it Important to Save the Tiger?

Tigers, as the largest carnivores, have an important functional role in Thailand's forest ecosystems.

- Tigers prey upon large mammals, but their role is greater than the animals they eat.

  The entire ungulate community has evolved in response to tigers. Hence the loss of tigers in an area has cascading effects on the ecosystems where they have become extinct.

  As the top predator in the landscapes where they occur, tigers require extensive habitats and thus serve as an indicator of the integrity and health of wild ecosystems and as an umbrella for the conservation of many other species and the last remaining large forested landscapes in Asia.

  Enhancing and saving the natural ecosystems required by tigers provides many benefits to humans, including:

- Water delivery for agriculture, industry, and household use

- Maintenance of forest cover to moderate climate change and maintain local climate regimes

- Preservation of biodiversity to enhance long-term ecosystem stability

- Protection of wild areas that provide irreplaceable aesthetic resources and opportunities for spiritual renewal for an increasing urban human population.

For millennia, the tiger has played a significant role in cultural and spiritual aspects of nearly every Asian society. Today, people throughout the world are inspired by the tiger's grace, beauty, and power. If wild tigers disappear from the earth, an important part of our culture and society will go with them.

In support of the King's "sufficient economy" initiative, Thailand is committed to the sustainable use and conservation of the country's natural resources. Tigers can serve as an inspirational icon for this critical endeavor.

Key Stakeholders in Tiger Conservation in Thailand

To be successful, tiger conservation in Thailand must be a national effort involving government agencies, non-governmental organizations, the private sector, the academic community, and the citizens of Thailand. This plan, rather than assigning responsibilities to specific agencies and individuals, is meant to provide strategic guidance to a diverse and growing collection of actors with a stake in tiger conservation.

The **Ministry of Natural Resources and Environment** is responsible for environmental and biodiversity policy and planning. **The Department of National Parks, Wildlife and Plant Conservation** is the lead implementing agency for tiger conservation. The DNP receives its mandate from the Wildlife Protection and Preservation Act A.D.1960 (1992 Amendment) and the National Park Act A.D.1961. Its main responsibilities include:

- managing activities within the forests and

protected area system in Thailand

- implementing the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)
- suppressing illegal wildlife trade within the country conducting educational outreach to the citizens, business leaders, and government organizations of Thailand.

Under the Ministry, the **Department of Environmental Promotion** and the **Royal Forest Department** also have important roles in protecting biodiversity and educating the public about conservation. **The Ministry of Agriculture and Cooperatives** has policies on livestock husbandry adjacent to protected areas which have a direct impact on tiger and prey populations. Promotion of irrigation and burning of agricultural residue influences watersheds and forests within protected areas.

The Ministry of Interior supervises provincial governors and district and sub-district officials. These senior government officials have a strong impact on conservation through their influence on road building and tourism development near protected areas.

The Ministry of Tourism and Sports, through wise promotion of ecotourism in cooperation with local villagers and the DNP, has a crucial role to play in providing economic incentives for communities to embrace tiger conservation and protect the landscapes that support tigers.

The Ministry of Education has an important role to ensure that basic concepts of the tiger's ecological and cultural significance become part of Thailand's standard curriculum at several educational levels and also to support research that contributes to our understanding of tiger ecology.

The Royal Thai Police has an important role to enforce the law related to wildlife and other natural resources. The police have **the Natural Resources and Environmental Crime Suppression Division** investigating and enforcing illicit wildlife trade throughout the country. **The Border Patrol Police** have also supported DNP in training park rangers working in protected areas and conducting joint patrols along the border areas.

Thai Customs Department is in charge of all the check points at the airports, seaports, and border areas around the country.

The Royal Thai Army is responsible for the management of some natural areas and represents an important training resource.

The Office of Attorney General is in charge of processing court cases related to wildlife and natural resources. It has district provincial offices throughout the country.

Provincial Government Offices can play a critical role in guiding and managing conservation work in their respective provinces.

Conservation NGOs, such as **WCS-Thailand, WWF Thailand, Freeland Foundation, Seub Nakhasathien Foundation,** have long supported tiger conservation activities in Thailand and often serve as a mechanism for ensuring that diverse stakeholders have a genuine voice in the conservation process. In many cases, NGOs have served as a conduit for new approaches and techniques, especially with tiger conservation, from around the world. NGOs raise funds for conservation projects, develop educational programs and publicize the plight of the tiger, support the government's efforts, fund ranger training and research, and act as watchdogs.

Community Leaders and Citizen Groups organized to address issues related to natural resources and the environment have an important contribution to make to the conservation of the tiger in Thailand.

They represent the public will. Citizen support and participation in decision making is still modest and needs to be expanded.

Universities contribute to tiger conservation by providing formal training and field experience, by managing and directing important research programs, and by encouraging the formal dissemination of research and lessons learned through academic conferences, the scientific literature, and other mechanisms. **Kasetsart University, Mahidol University,** and **King Mongkut's University of Technology Thonburi** in particular are the main universities in Thailand that produce wildlife and conservation biologists to serve in many conservation organizations, including DNP.

Privates Companies such as the **Petroleum Authority of Thailand Exploration and Production Public Company Limited** has provided funding for research equipment and supported tiger research efforts such as the Tiger Project at Khao Nang Rum Wildlife Research Station.

Individual Thai Citizens will ultimately determine where tiger conservation ranks on the list of national priorities. Active engagement with the public is thus essential if tiger conservation efforts are to succeed over the long term.

The Natural History of the Tiger

The tiger is the world's largest cat species with wild populations occurring from the far east of Russia to the rainforests of Indonesia. Tigers are largely solitary and territorial; they represent the top of the food chain in all areas where they occur.

Although wild tigers have historically been grouped into subspecies, conservation and genetic management objectives support a stronger emphasis on populations and metapopulations. For example, the geographical distribution of tigers in South Asia represents a continuous decline from the southern tip of India north and eastward through northeast India. The Indochinese tiger extends from Myanmar and southern Yunnan through Laos, Vietnam, Cambodia to the Isthmus of Kra in Thailand. Each subspecies is composed of discrete, largely isolated populations. Many of these populations are small and threatened, so to ensure a future for tigers it is crucial to maintain the land base that supports the remaining few large populations remaining. As few as 3,000 to 3,500 tigers remain globally and only about 1,000 in SE Asia. We must treat every population of tigers as unique and worthy of our best conservation efforts.

For tigers to survive in the wild, they must have sufficient water, cover, and, most importantly, abundant large mammal prey weighing more than 50 kgs. On average, tigers make 40 - 50 kills a year when there is sufficient large prey available (Chunderwat *et al*. 1999; Karanth and Nichols 2002; Seidensticker and McDougal 1993; Sunquist 1981). A study of tiger prey in western Thailand found that tigers consume mostly banteng and sambar, and to a lesser degree gaur, wild boar and barking deer (Petdee 2000). Opportunistically, tigers also attack and eat bears, tapir, young elephants, primates, porcupine, and even peafowl (Petdee 2000; Prayurasiddhi 1997).

Densities of principal prey species influences tiger densities in several ways. As prey densities decline, breeding female ranges become larger, dramatically reducing the number of such females that an area can support. For instance, the size of female home ranges in productive South Asian forests and grassland is 10-20 km2, whereas in the Russian Far East it is as large as 200-400 km2 (Karanth and Sunquist 2000; Miquelle *et al*. 1999; Sunquist 1981).

A long-term study of tigers in Huai Kha Khaeng Wildlife Sanctuary in Thailand has shown that male tigers have home range sizes between 220-291 km2 and female home ranges are between 63-78 km2 (Simcharoen pers. Comm; Simchareon *et al*. 2007). The objective of this study is to determine tiger carrying capacity based on the size of female home ranges in relation to prey abundance. Five females and 3 males have been collared with satellite GPS transmitters to determine the size of home ranges and habitat use patterns. These intensive studies are complimented by an extensive long term camera trapping study in Huai Kha Khaeng, Thung Yai East, and Thung Yai West wildlife sanctuaries.

Tigers moving through an area usually leave overt and distinctive evidence of their presence including tracks, scrapes, and claw marks on trees. Tigers also spray urine on trees and deposit urine and feces on the ground (usually in association with visibly distinctive hind paw scrapes). These scent marks leave an unmistakable odor that may last for several days. Together, these visual and olfactory cues help tigers communicate the boundaries of their territory to other tigers and a range of other species (Smith *et al*. 1989).

Of the many sounds a tiger is capable of emitting, the most likely to be heard is the awesome moaning, 'aa-oo-mh, aa-oo-mh', used during the mating season. This call carries over considerable distances, attracting the resident male to the estrous female. Other vocalizations, which may be heard at close range, include low growling, snarling and coughing grunts. The roar of a tiger is unforgettable in any circumstance.

When tigers mate, they usually remain together for 2 - 5 days, copulating every 15 - 20 minutes day and night. After 102 - 105 days, the female dens in dense vegetation and produces on average 3 cubs. During the first 2-3 days after birth, the female remains at the den for up to 23 hours a day; she gradually leaves for longer periods until the den is abandoned when the cubs are about 2 months old. For the next 2-3 months, the female moves the cubs from place to place, but they still remain hidden most of the day.

Until the cubs are several months old, the cubs go to a kill only after the prey animal has been dispatched by the mother (Smith 1993). By 6 - 7 months of age the cubs begin to accompany their mother on hunts, but the final stalk and kill is by the mother alone. At 11-13 months the cubs' milk canines begin to protrude, pushed out by the emerging adult canines that are fully erupted at 16-17 months. Even though they have

the "equipment" to kill prey at this point, young tigers require 2 - 3 additional months to learn to kill efficiently on their own. During this time, they gradually become independent from the mother, but continue to hunt within the security of her territory. During the years of her life when she is reproductively active, a female will typically give birth from 19 - 24 months after her previous litter is born. Two months later, when she and the cubs abandon the den site, aggression between the female and her previous litter marks the onset of dispersal of the older offspring. The young leave the territory where they were born and raised and face the most critical period in their lives over the next few months of early independence.

Approximately 60% of young males and 40% of females die during this dangerous dispersal period (Smith 1993).

Tigers are territorial. Females protect their area from others of the same sex; males, which have territories overlapping those of 2-7 females, do likewise. Dispersing young face a gauntlet of resident animals guarding their territories and are often forced to reside temporarily in suboptimal habitat at the edge of protected areas where they may come into conflict with humans and their livestock. For females, the dispersal stage usually lasts about 1 year. About 40-50% of daughters settle next to their mother, who will often shift her territory slightly to accommodate a daughter. However, by the time the daughter is fully established as a resident, there is little overlap with her mother's territory.

For males, the task of establishing a breeding territory is more arduous and dangerous. It may take more than 2 years and involve a series of aggressive encounters with resident males which can lead to serious, even incapacitating wounds and sometimes even death.

Unlike in South Asia, where violent and sometimes lethal encounters between humans and tigers are not uncommon, Thailand has few records of aggressive interactions between humans and tigers. The most recent cases of direct human tiger conflict are two cases in Khao Yai National Park: one resulting in the death of a human and a tiger (in 1976) and the other resulting injuries to a human and subsequent killing of the tiger (in 1999). In both cases, the tigers involved were old, had damaged teeth, and were suffering from debilitating wounds that prevented them from pursuing and killing their usual prey.

Livestock depredation occurs regularly, but not

nearly at the frequency experienced in much of South Asia. A few cases of the killing of tigers involved in livestock depredation by local villagers have also been recorded.

Threats to the Tiger

The most significant challenges to tiger survival in Thailand are the same as those faced throughout the species' range: habitat degradation and poaching of prey and tigers. Poaching of tiger prey is primarily driven by an active commercial trade in wildlife to satisfy growing demands by restaurants. Direct poaching of tigers is expected to increase in areas where tigers exist and is driven by the traditional medicine market and ritual demands for amulets.

The gradual conversion of forest cover loss over this past century has resulted in fragmented forest habitat in Thailand that has created isolated tiger populations. Many of these populations are too small to have long-term viability unless current habitat is protected, the amount of habitat increased, and habitat fragments connected by corridors (Smith *et al*. 1998; Wikramanayake *et al*. 1998).

Prey depletion is another important threat to tigers (Karanth and Sunquist 1995). Poaching of prey species is intensive in many protected areas in Thailand. In large portions of many of the protected areas where tigers still occur, there is little or no sign of prey species. Reversing the decline of prey populations within otherwise suitable habitat is crucial not only for the tiger, but also for the ecosystems in which it occurs.

In the early 1990s, tiger poaching increased dramatically throughout the tiger's range. In 2005 the world was shocked with the report that tigers were extinct from Sariska National Park, one of India's

prime tiger reserves. This story brought the problem to the attention of the global public, but the response did not match the growing threat and tiger populations continued to decline. Only about a year later, another of India's premier tiger reserves, Panha National Park, also reported that tigers had been wiped out. Since then, reports of similar trends have become all too common.

In Thailand in March 2010, at least 3 tigers were found dead from poisoning in the interior of Huai Kha Khaeng Wildlife Sanctuary, the site of Thailand's highest tiger densities. While the poachers were confronted by a research team at the scene of the crime, they were able to escape arrest and take with them various parts of a poisoned tiger.

The above examples indicate that tigers are a protection dependent species. Protection at site and landscape levels is imperative if tigers and their prey are to be saved and recovered. Recent scientific findings reveal that existing protection quality in many protected areas in Thailand is not enough to save them. The inefficiency in patrols and lack of law enforcement and monitoring systems is considered a impediment to tiger conservation in Thailand. The system needs to be modernized and the support to park rangers needs significant improvement.

Several other significant factors hinder the survival of the tiger. One is a lack of commitment to using rigorous techniques for estimation of many tiger population parameters. Without baseline data on tiger populations there is no way to measure the success of management efforts. Another gap is the lack of a broad-based awareness and support for tiger conservation. The full support of the people of Thailand and cooperation across institutions and jurisdictional boundaries is vital to securing a sufficient land base for tigers in Thailand.

The Status of Tigers in Thailand

To provide an overview of tiger status in Thailand, the Wildlife Research Division of the Department of National Parks, Wildlife and Plant Conservation conducted sign surveys in 149 terrestrial protected areas from 2004 to 2007 (Kanchanasaka et al. 2010). The results of these surveys were combined with data from several other completed and ongoing studies, providing an accurate estimate of the occupancy and estimated numbers of tigers in Thailand. Sources of data used in this compilation can be found in the Appendix.

Tiger status surveys employed 2 main approaches, (1) searching for signs of tigers over 11,411 km2 of likely tiger travel routes and (2) surveying by using camera traps to record photos of tigers carried out over 3,000 km2 within eight protected areas (Appendix 3 and 4). Both survey approaches focused on the routes most likely used by tigers in given areas such as dirt roads, animal trails, human footpaths, dry riverbeds, and ridgelines.

Track survey data were summarized as the proportion of 500 meter sections walked in which tiger tracks were encountered at least once. Camera trap data were analyzed using capture-recapture techniques to generate estimates of the density of tigers within given survey areas.

To the best of our knowledge, tigers in Thailand occur strictly within the boundaries of existing protected areas. In order to express the status of tiger occurrence at the national level, we applied the following criteria at the resolution of individual protected areas (Table 1):

Conclusion

In Thailand, tigers occur in 25 of 188 terrestrial protected areas from the southern border with Malaysia to the far north near the borders with Laos and Myanmar. Nine of twenty five protected areas have moderate to high tiger density, and only two of these nine protected areas have a high density of tigers. Currently tigers occur in 10 of 17 recognized terrestrial forest complexes. 6 of 10 forest complexes

Table 1 Rules applied to map tiger status at the resolution of individual protected areas in Thailand. The satisfying of any abundance rule was considered sufficient to apply that status class to a particular area.

	Assessment Method & Definitions (Status assigned based on highest class satisfied by any method)		
Status Class	**Density Estimate from Capture – Recapture Camera Trap Data**	**Sign Encounter Rate Index**	**Other**
Tigers occur in relatively high abundance	Estimated density 2.7–2.1 tiger/100 km_2	Proportion of 500 m segments surveyed with tiger sign ≥ 14	In some areas that have informationon tiger abundance from both sign surveys and camera trap surveys, we use the information from camera trap
Tigers occur in moderate	Estimated density between 1 tiger / 100–150 km_2 and 1.4–0.8 tiger/100 km^2	Proportion of 500 m segments surveyed with tiger sign between 8.3 and 3.7	
Tigers occur in low abundance tiger sign ≤ 2	Estimated density 1 tiger / 250–300 km_2	Proportion of 500 m segments surveyed with tiger sign ≤ 2	Evidence for tiger occurrence in this area is irrefutable but is insufficient to establish anything but presence in this protected area
Substantial survey effort indicates that tigers do not occur in these areas	No tigers encountered after 500 trap-nights in sites representing optimal tiger habitat for this protected area	No tigers encountered after at least 10 km of sign survey effort in sites representing optimal tiger habitat for this protected area	
Protected area without surveying		This area contains less potential tiger habitat and sign surveys have not taken place	No record of tiger occurrence over the last 10 years

support low densities of tigers, and one (Western Forest Complex) has a core area with a high tiger density (Huai Kha Khaeng Wildlife Sanctuary) while the other three forest complexes (Khaeng Krachan Forest Complex, Dong Phayayen-Khao Yai Forest Complex (DP-KY), and Hala-Bala Forest Complex) support moderate tiger densities. During 2008 and 2009, Thailand's tiger biologists from Khao Nang Rum Wildlife Research Station conducted camera trap surveys in Huai Kha Khaeng and Thung Yai Wildlife Sanctuary documenting photo-captures of 39 and 14 individual tigers respectively. Based on the results and the sign surveys summarized above, biologists have reached a consensus conclusion that there are likely 190-250 tigers remaining in Thailand (Appendix 2).

Along the Thai-Myanmar border, the Western Forest Complex and the Khaeng Krachan Forest Complex both support significant tiger subpopulations that are connected by extensive intact forests in Myanmar. Together, these areas can support one of the largest tiger populations in the world.

Best Practices for Tiger Conservation

In order to succeed in its goals for tiger conservation, Thailand must continue to draw on lessons learned from past efforts. It is important to critically evaluate what has contributed to successful conservation of tigers in areas where they still occur and to identify what has led to their decline or extinction in other areas.

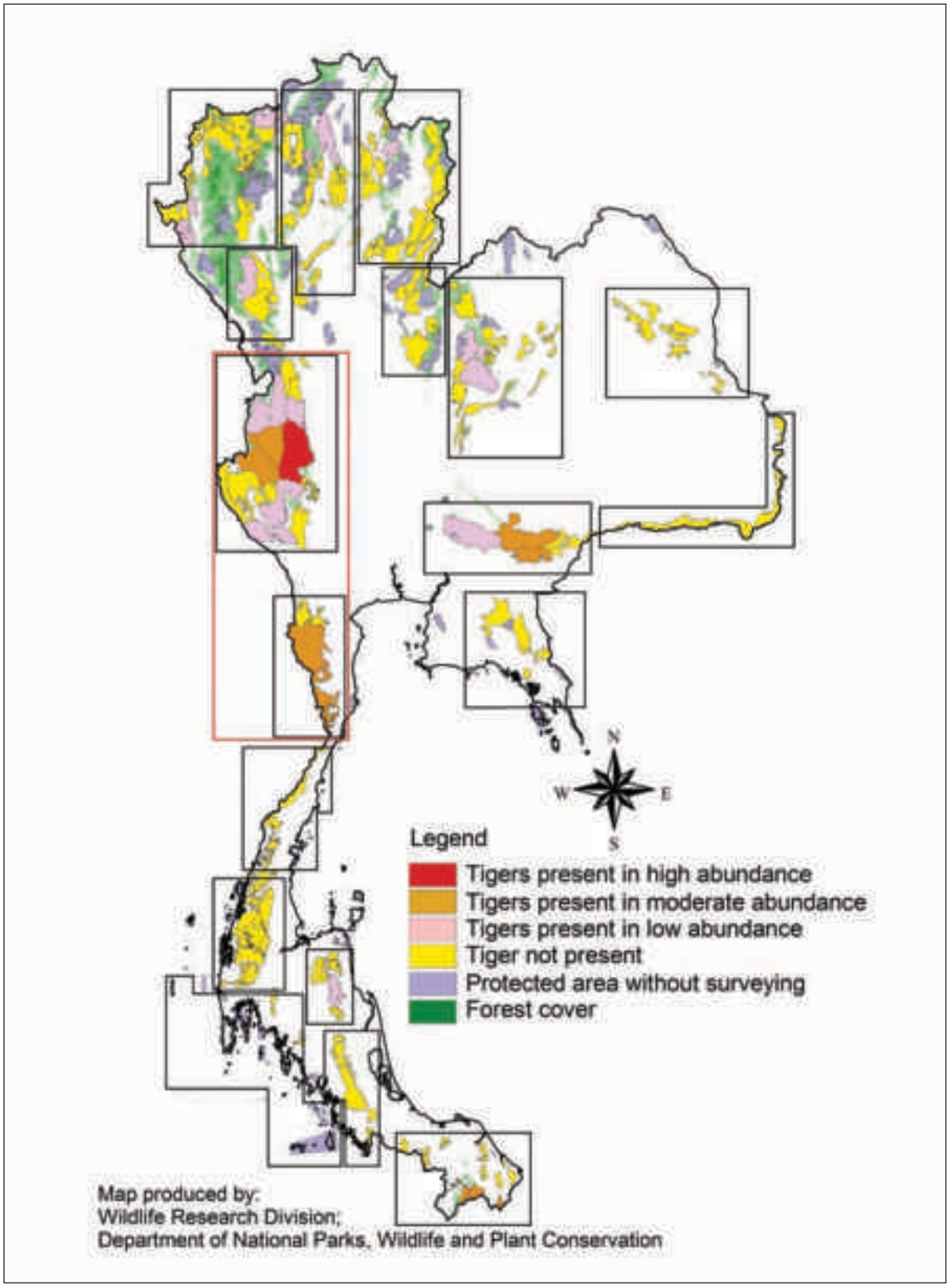


Figure 1 Map showing relative tiger abundance in Thailand. Boxes indicate forest complex management units (Prayurasiddhi *et al*. 1999). The red box indicates the Tenasserim-WEFCOM Tiger Landscape, the only area where tigers occur in high abundance.

The Huai Kha Khaeng Wildlife Sanctuary (HKK) is the location of Thailand's highest measured tiger densities and represents a unique conservation success story in the region. HKK has experienced highs and lows in protection quality. Past observations made by researchers and managers indicated that populations of tigers and their prey species were lower than current levels. Gun shots could be heard everywhere deep inside HKK. Relocations of villages inside HKK more than 20 years ago have given tigers and other wildlife a safer space. Strict protection is the key to controlling poaching in the area. The recovery of tigers and prey has recently been sped up by a modernized protection system, and HKK is now one of the most progressive and systematic tiger and prey management systems in the region.

Another unique development was the application of landscape scale management based on ecosystem management practice. The Western Forest Complex Ecosystem Management Project (WEFCOM 2004) has significantly raised the importance of landscape scale conservation by advocating four main actions including (1) improving protection by training park rangers and strengthening coordination among protected areas, (2) adopting science-based management, (3) establishing provincial conservation fora, and (4) strengthening conservation awareness for local communities.

This management concept is the key to developing further programs to strengthen management, monitoring, research, and partnerships within WEFCOM. Following the WEFCOM ecosystem management project, a tiger focus conservation project, started in Huai Kha Khaeng and Thung Yai Wildlife Sanctuaries since 2005, has given a best-practice management model to protect tigers and their prey. This model includes high impact interventions and monitoring systems at various levels.

Management and Monitoring at Site Level:

- **Smart Patrol System:** Smart Patrol System is a systematic patrol that maximizes the power of information to guide the patrol planning. It currently uses MIST (Spatial Management Information System) as a platform. Park rangers under this system collect important information such as patrol routes, patrol coverage, patrol intensity, points of threats, points of key wildlife species, etc. The information is displayed on maps and in tables. Information reported and discussed among the park rangers and managers is brought to the monthly patrol leader meeting. This results in high morale and self esteem among park rangers. Tigers and prey have subsequently been better protected and are recovering.

- **Intensive long-term monitoring of tigers using camera trapping and capture-based models:** Tiger population monitoring is an integral part of the management scheme for tiger conservation. Since 2005 an annual systematic camera trapping program covering about 1,000 km2 sample area has revealed a density of about 2-3 tigers per 100 km2 and has shown it is stable. Between 7-12 new tigers were captured annually. Camera trapping in Thung Yai Wildlife Sanctuaries has alternated yearly between Thung Yai East and Thung Yai West Wildlife Sanctuaries.

Management and Monitoring at the Landscape Level:

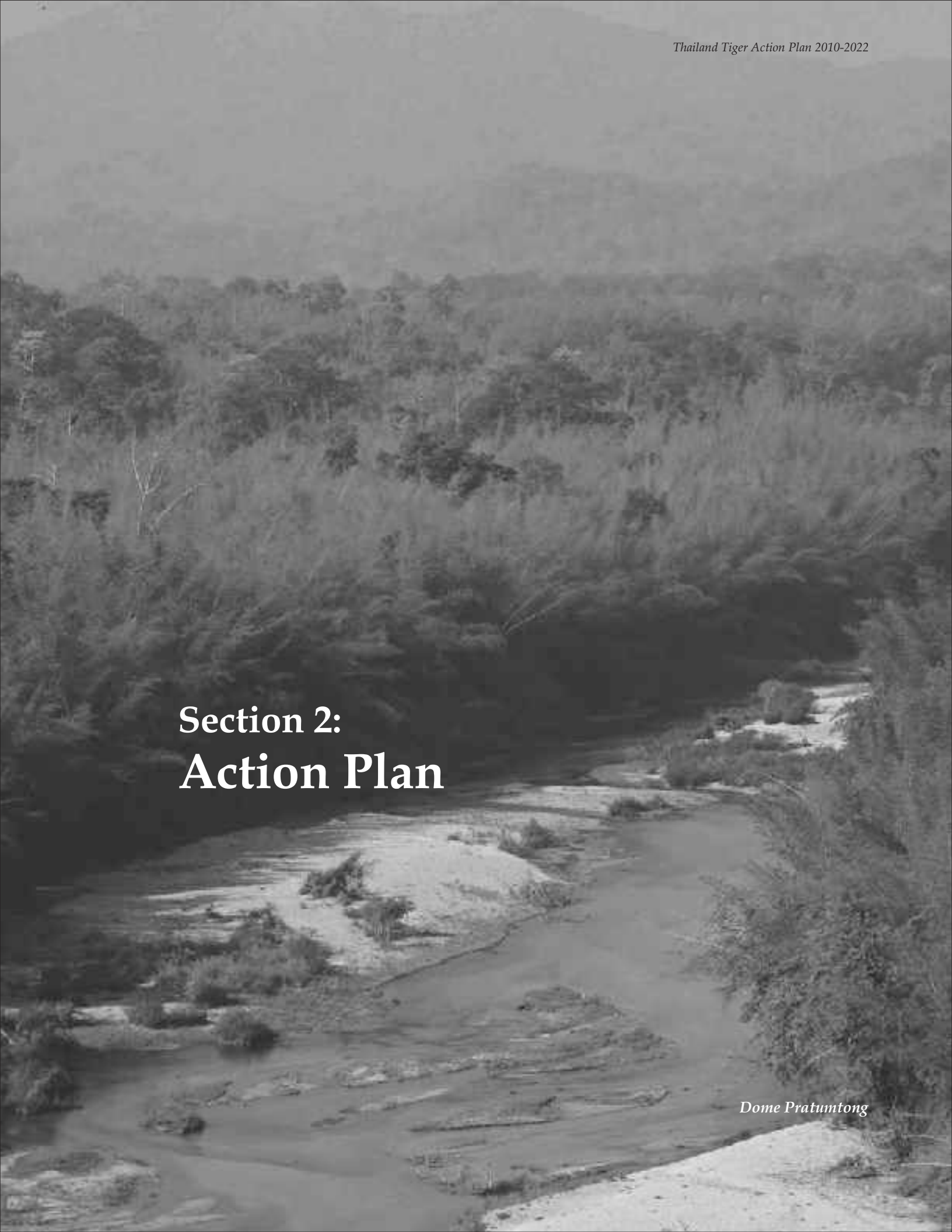
- **Wildlife crime units and wild meat restaurant database:** These are a major intervention to control the demands of wild meat from outside Huai Kha Khaeng Wildlife Sanctuary and other protected

areas adjacent to HKK. A wildlife crime unit was established at the Protected Area Administration Office (PAAO) 12 (Nakornsawan Province) to gather information and enforce wildlife law outside WEFCOM. The unit also gathers information from the wildlife crime web-based database, created for the public to inform them about places around WEFCOM where there is suspected trading of illegal wildlife and wild meat. The tracking of illegal wild meat has become more systematic and enforcement has become more focused.

- **Public campaign with the focus on communities around Huai Kha Khaeng Wildlife Sanctuary:** A focused campaign using the tiger as an iconic species has been launched with strong support from local sub-district administration offices and schools. It focuses on wild meat restaurants, local schools, and communities adjacent to Huai Kha Khaeng Wildlife Sanctuary. The campaign uses the manual "Teachers for Tigers" to work with local schools. This focused campaign has gained clearer and stronger support from local communities for the work to save tigers in HKK and WEFCOM.

- **Occupancy survey:** To survey tigers within WEFCOM, a landscape occupancy monitoring system has been adopted. DNP researchers have worked with support from NGO partners to conduct a systematic survey of WEFCOM in 2010-2011 and plan to repeat this every 3-4 years. The teams walk along the designated grid cells looking for tiger tracks and signs. The monitoring system allows for an understanding of the patterns of tiger distribution in WEFCOM landscape and indicates any changes in tiger bahaviour resulting from managment activities.

The Department of National Parks, Wildlife and Plant Conservation has begun to scale up the model to eight other wildlife sanctuaries and five national parks.



Section 2:
Action Plan

Dome Pratumtong

Vision

By 2022 tigers have recovered and thrive in the priority landscapes managed under high standard interventions and monitoring systems, and Thailand has become a strong support for international collaborations on tiger and wildlife conservation and protected area management in Southeast Asia.

Goals

2-year goals

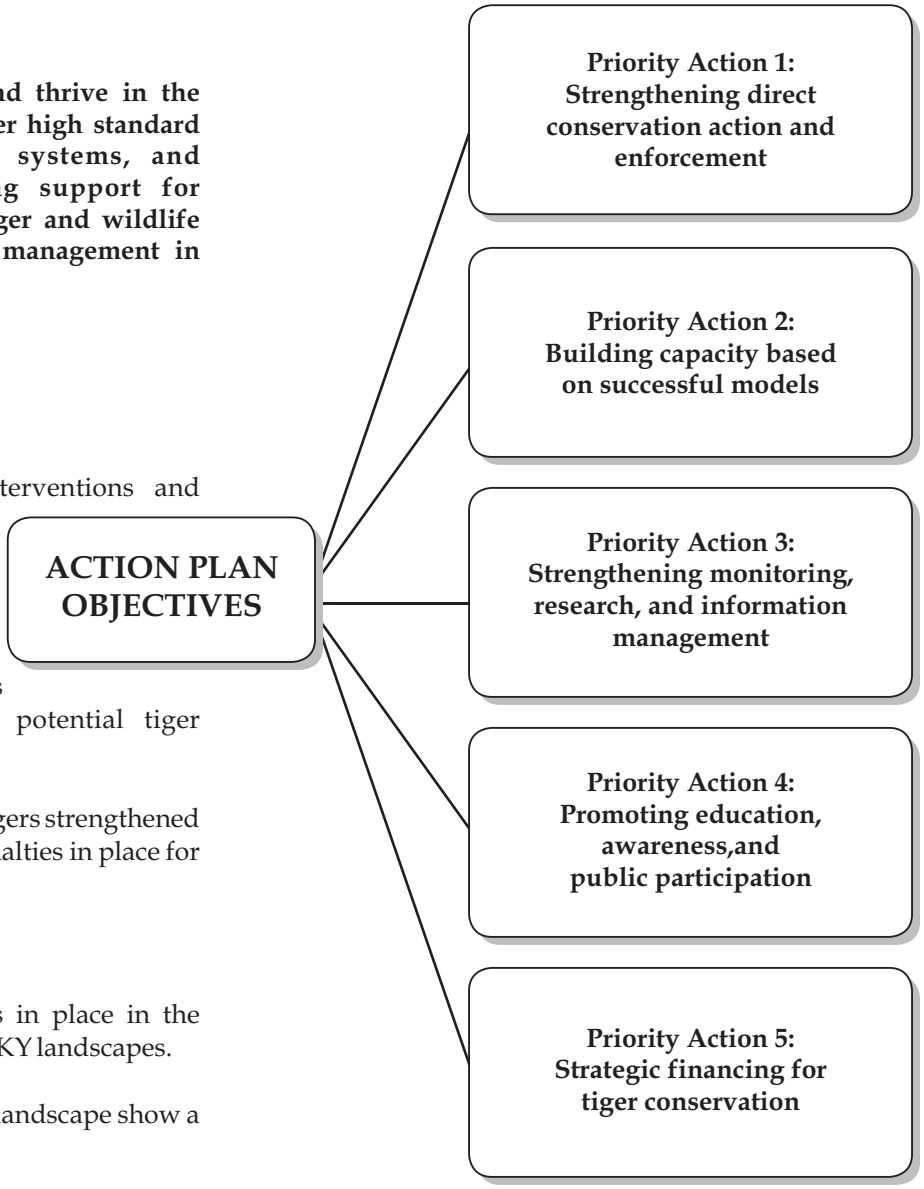
- High-standard monitoring interventions and monitoring systems established and functioning in Tenasserim-WEFCOM and DP-KY landscapes.
- Tiger occurrence status established at all additional potential tiger landscapes.
- The system to monitor captive tigers strengthened and standardized with clear penalties in place for violations.

5-year goals

- Effective management systems in place in the Tenasserim-WEFCOM and DP-KY landscapes.
- Key tiger threats in the priority landscape show a clear decline.
- Important tiger ecology (e.g., home-range variation) in the priority landscapes very well understood and used to guide management.
- Tiger populations stabilized or increased in Tenasserim-WEFCOM and DP-KY landscapes and possibility for re-establishing in other areas explored.

12-year goals

- To increase tiger populations of Thailand by increasing the populations in the Tenasserim – WEFCOM and DP-KY landscapes by 50%, and reestablish populations in other potential tiger landscapes such as Phu Khew – Nam Nao
- Forest Complex and Klong Saeng – Khao Sok Forest Complex.



Action Plan Objectives

For the 5 priority actions mentioned in Section 1, 19 objectives are identified. Activity details of the objectives are described in detail in the next section.

Priority Action 1: Strengthening direct conservation action and enforcement

Objective 1: Promote conservation efforts at the scale of entire populations (e.g., forest complex and associated corridors)

Objective 2: Provide long-term support for tiger habitat restoration activities

Objective 3: Ensure that the government policy of protecting tiger habitat from development threats, as committed to in the Hua Hin declaration, is followed

Objective 4: Encourage community participation and cooperation in protected area conservation activities

Objective 5: Support local communities in developing sustainable economies that reduce dependence on forest resources

Objective 6: Facilitate international cooperation in tiger conservation efforts

Objective 7: Strengthen national laws, policies, and enforcement of tiger related crimes

Objective 8: Support national and international efforts to manage captive tigers responsibly

Priority action 2: Building capacity based on successful models

Objective 9: Establish a Regional Tiger Conservation and Research Center at Huai Kha Khaeng Wildlife Sanctuary

Objective 10: Ensure national training capacity can deliver high quality tiger conservation training at all levels

Priority action 3: Strengthening monitoring, research, and information management

Objective 11: Monitor tiger and prey populations in priority landscapes

Objective 12: Maintain long-term tiger and prey ecology research in priority landscapes

Objective 13: Ensure that relevant information for tiger conservation is well managed and available to inform strategy and planning

Priority action 4: Promoting education, awareness, and public participation

Objective 14: Convey tiger conservation-related messages to a diverse Thai public, policy-makers, and politicians

Objective 15: Ensure that basic concepts of the tiger's ecological and cultural significance become part of Thailand's standard curriculum at several educational levels

Objective 16: Ensure that co-benefits of tiger landscape conservation are understood and appreciated

Priority action 5: Strategic financing for tiger conservation

Objective 17: Identify the costs of effective tiger conservation, current expenditures, and efficiency of these expenditures

Objective 18: Make use of large scale funding opportunities such as Global Environment Facility for Biodiversity (GEF) 5, REDD, and other programs to fund tiger conservation efforts

Objective 19: Develop sustainable funding mechanisms

Activities to Achieve the Objectives

Activities to achieve the objectives are very important part of this action plan to guide the implementation and evaluation processes. To ease the use of the action plan, activities are grouped hierarchically under the objectives for each of the 5 priority actions. Under each objective, key challenges and opportunities are outlined. Activities that respond to or address these challenges and opportunities are then described. The expected outcome, duration, and location of the activities are also addressed under each objective.

Priority Action 1: Strengthening direct conservation action and enforcement

Objective 1: **Promote conservation efforts at the scale of entire populations (e.g., forest complex and associated corridors)**

Challenge: Conservation efforts at the landscape scale are the most important in tiger conservation and recovery, but the majority of areas still lack efficiency and the necessary broad oversight.

Opportunity: Systematic management and enforcement systems under the Smart Patrol System inside the core area of Tenasserim - WEFCOM and the wildlife crime units operating outside the protected area have become a model for Thailand in striving for the recovery of wild tigers.

Expected outcome: The real landscape protection cost, actions, and activities to stop bleeding and to recover wild tigers are understood and adopted at the policy level.

Duration and locations: 12 years, Tenasserim – WEFCOM as the tiger source site and DP-KY as the potential source site.

Activities necessary to accomplish this objective:

Activity1: Strengthen and standardize the "MIST-based Smart Patrol System" in protected areas of current tiger source and potential source sites, including Tenasserim –WEFCOM and DP-KY.

Activity2: Increase the number of competent park ranger teams patrolling in each protected area of priority landscapes up to the level that can effectively secure tigers and their prey.

Activity 3: Strengthen wildlife crime units and informant networks around Tenasserim – WEFCOM and DP-KY to suppress local demands of wild meat and illegal wildlife trade and help apprehend wildlife criminals around protected areas.

Activity 4: Work with district attorneys and judges to ensure substantial punishments on wildlife crimes against tigers and large ungulates.

Activity 5: Overhaul the park ranger system to a higher living and working standard, and provide rewards and incentives to encourage patrolling (e.g., patrolling budgets) and other significant morale boosting programs such as performance-based promotions.

Activity 6: Apply landscape-scale ecological and development models for tiger conservation and engage stakeholders in development sectors (i.e., roads, oil and gas, mining, power) to minimize and mitigate impacts in sectoral activities on tiger habitats.

Objective 2: **Provide long-term support for tiger habitat restoration activities**

Challenge: Many areas in tiger landscapes and potential landscapes are suitable for tiger recovery, but have low ungulate densities due to poaching.

Opportunity: Recovery of wild ungulates as tiger prey and habitat

management in the tiger source site has started to help recovery tiger prey and finally tigers.

Expected outcome: Habitat is suitable for other wildlife species and native biodiversity is restored.

Duration and locations: 12 years, Tenasserim – WEFCOM as the tiger source site and DP-KY as the potential source site.

Activities necessary to accomplish this objective:

Activity 7: Promote use of controlled burning in potential and manageable parts of priority landscapes to maintain grassland for ungulate recovery.

Activity 8: Prevent and suppress fires effectively in evergreen forest areas in priority landscapes to provide good cover and watersheds for tigers and wildlife.

`Amonrat Wongwai

Activity 9: Strengthen the reintroduction program of ungulate prey with the ex-situ succeeded species (i.e., sambars, eld's deer, hog deer) in suitable habitats.

Activity 10: Maintain natural and existing artificial water sources that benefit tigers and ungulates especially during drought periods in priority landscapes.

Activity 11: Establish a system to control invasive species (e.g., *Lantana camara, Mimosa pudica*) in priority landscapes.

Activity 12: Identify priorities for corridor and habitat restoration.

Objective 3: Ensure that the government policy of protecting tiger habitats from development threats, as committed to in the Hua Hin declaration, is followed

Challenge: Large development projects (e.g., highways, dams) are under development and with new proposals often suggested.

Opportunity: Public disapproval of environmental impacts of large scale development projects such as roads and dams is high in many sectors of Thai society.

Expected outcome: Tiger habitats in priority landscapes are intact and connectivity is maintained.

Duration and locations: 12 years, Tenasserim – WEFCOM as the tiger source site and DP-KY as the potential source site.

Dome Pratumtong

Activities necessary to accomplish this objective:

Activity 13: Ensure that no major infrastructure development occurs in core tiger habitats.

Activity 14: Ensure that infrastructure development in corridors and buffer zones conform with Smart Green Infrastructure designs to ensure minimal impact to tiger habitats and maintain landscape connectivity.

Objective 4: Encourage community participation and cooperation in protected area conservation activities

Challenge: Community participation

and cooperation processes are still weak in substance on the link with wildlife conservation.

Opportunity: Protected area committees have been set up in many protected areas to be a platform for participation and cooperation.

Expected outcome: Communities appreciate value of wildlife and help save them.

Duration and locations: 12 years, Tenasserim – WEFCOM as the tiger source site and DP-KY as the potential source site.

Activities necessary to accomplish this objective:

Activity 15: Strengthen and build wildlife conservation networks around the priority landscape to enhance tiger and wildlife conservation in the priority areas.

Activity 16: Provide Protected Area Committees (PAC) and Community Committees (CC) with quality information (e.g., data from Smart Patrol System) on which to base threat reduction decisions and activities.

Objective 5: Support local communities in developing sustainable economies that reduce dependence on forest resources

Challenge: Many local communities living inside and around protected areas of tiger landscape are still using natural resources, especially poaching, in an unsustainable rate.

Opportunity: Wildlife ecotourism can generate a significant alternative income for local communities if managed properly and effectively.

Expected outcome: Improved livelihoods and reduced poverty for local people.

Duration and locations: 12 years,

Tenasserim – WEFCOM as the tiger source site and DP-KY as the potential source site.

Activities necessary to accomplish this objective:

Activity 17: Link communities with agricultural science institutes and agencies to promote agro-forestry in buffer zone areas around priority landscapes to reduce collection of Non Timber Forest Products (NTFPs) inside Protected Areas (PAs).

Activity 18: Develop wildlife-based ecotourism with concrete benefit sharing with communities in appropriate areas in and around PAs.

Objective 6: Facilitate international cooperation in tiger conservation efforts

Challenge: Tiger trade at the international level impacts the populations at the site and landscape levels.

Opportunity: CITES check points are an example of an effective approach to control wildlife trade near the border. ASEAN-WEN also helps strengthen enforcement cooperation among neighboring countries to fight wildlife crimes.

Expected outcome: A stronger international network to fight wildlife crime.

Duration and locations: 12 years, CITES Check points, airports, sea ports.

Activities necessary to accomplish this objective:

Activity 19: Strengthen enforcement capacity of Thailand's CITES programs with better interagency-collaboration and stronger protocols and impact monitoring systems on wildlife trade.

Activity 20: Strengthen and sustain capacity of ASEAN-WEN.

Activity 21: Strengthen bi-lateral cooperation with Cambodia, Laos,Malaysia and Myanmar for transboundary enforcement and monitoring and research.

Supol Pittayasaku

Objective 7: Strengthen national laws, policies, and enforcement of tiger related crimes

Challenge: Enforcement and punishment of wildlife crimes are not strong enough to significantly reduce illegal activities on tigers and wildlife.

Opportunity: The Wildlife Reservation and Protection Act and National Park Act have been in place for Thailand for 50 years as the main laws to protect tigers and their habitats.

Expected outcome: Wildlife crimes are given priority at the policy level.

Duration and locations: 12 years, National level.

Activities necessary to accomplish this objective:

Activity 22: Strengthen enforcement on wildlife crime under the Wild Animal Reservation and Protection Act B.E.2535 (1992) to make sure that convicted offenders receive the highest penalty of Wildlife Laws and related legislations.

Activity 23: Strengthen Thailand Wildlife Enforcement Network (Thailand- WEN) information sharing capacity.

Activity 24: Strengthen investigative capacity and judiciary effectiveness in wildlife crime cases.

Activity 25: Strengthen communication campaigns on wild tiger conservation.

Activity 26: Memorandum of Understanding (MoU) with military, police, Ministry of Interior, Ministry of Education to be strengthened and implemented for better collaboration and training for enforcement.

Objective 8: **Support national and international efforts to manage captive tigers responsibly**

Challenge: Legal and illegal tiger zoos in Thailand are becoming a challenge for the government to control illegal tiger trade.

Opportunity: DNP has started using the tiger stripe database to control tigers in the zoos and is trying to curb illegal tiger trade.

Expected outcome: Public at large have a better understanding of the difference between wild tiger conservation and illegal captive tiger business that harms tiger conversation.

Duration and locations: 12 years, places with illegal captive tigers, zoos, and amusement parks.

Activities necessary to accomplish this objective:

Activity 27: Design and enforce the control programs for captive breeding of tigers in legal tiger zoos with a captive tiger database of individual tracking records.

Activity 28: Discourage illegal activities involving captive tigers, using effective public campaigns which highlight the impacts of tiger conservation.

Activity 29: Public campaigns showing the difference between wild & captive tiger conservation.

Priority action 2: Building capacity based on successful models

Objective 9: **Establish a Regional Tiger Conservation and Research Center at Huai Kha Khaeng Wildlife Sanctuary**

Challenge: High standard curricula and efficiency in international collaborations are important to run a regional training center.

Opportunity: The Smart Patrol System and tiger and prey population monitoring and research programs in WEFCOM have long been in operation and of good enough quality to contribute to tiger conservation and research in the Southeast Asian region.

Expected outcome: The skills of tiger conservation and research are being shared in the region by using the facility in WEFCOM as one of the best places to encounter tiger signs, tracks, and tiger prey in Southeast Asia.

Duration and locations: 12 years, Huai Kha Khaeng Wildlife Sanctuary.

Activities necessary to accomplish this objective:

Activity 30: Designate staff and design an administrative structure to run the center with shared experiences and administrations.

Activity 31: Ensure that the training center has sufficient facilities and equipment to provide high quality training in management, enforcement, and research to serve both Thailand and the region.

Activity 32: Establish technical and enforcement-related curricula that will prepare participants to meet protected area management standards.

Objective 10: **Ensure national training capacity can deliver high quality tiger conservation training at all levels**

Challenge: Numbers and capacity of trainers to conduct high quality training courses on tiger conservation at the national level are still limited.

Opportunity: High standard trainings with tiger conservation focus have existed in Huai Kha Khaeng and Thung Yai Wildlife Sanctuaries for many years.

Expected outcome: The quality of trainers and trainees are improved with high standard courses.

Duration and locations: 12 years, Tenasserim – WEFCOM as the tiger source site and DP-KY as the potential source site.

Activities necessary to accomplish this objective:

Activity 33: Strengthen the local instructor capacity for conducting training courses for tiger research and conservation for Thai and international audiences.

Activity 34: Establish a national standard as sufficient resources for tiger conservation training.

Priority action 3: Strengthening monitoring, research, and information management

Objective 11: Monitor tiger and prey populations in priority landscapes

Challenge: Populations of tigers and prey in the core areas of priority landscapes need intensive monitoring systems with up-to-date technologies to be able to speak with confidence on population trends.

Opportunity: The rigorous population monitoring systems of tigers and prey have been run in the core area of WEFCOM for many years with collaborative support.

Expected outcome: The success of tiger conservation activities can be strongly linked to the target, which is the occurrence of tigers and their prey.

Duration and locations: 12 years, Tenasserim-WEFCOM as the tiger source site and DP-KY as the potential source site and other protected areas for a nation-wide survey.

Activities necessary to accomplish this objective:

Activity 35: Maintain and establish high standard annual population monitoring systems for tigers and their prey in tiger sources and potential source sites in the priority landscapes.

Activity 36: Establish landscape scale occupancy monitoring systems for tigers and prey throughout the two priority landscapes.

Activity 37: Implement a nationwide survey and reporting system on tigers and prey occurrence based on scientific methods.

Objective 12: Maintain long-term tiger and prey ecology research in priority landscapes

Challenge: Understanding the dynamics of tiger biology and ecology in different habitats and landscapes is very important for tiger conservation and restoration.

Opportunity: Huai Kha Khaeng Wildlife Sanctuary is the only site in Southeast Asia with intensive long-term tiger research by a strong research team.

Expected outcome: Managers and conservation scientists have better understanding of how tigers use the landscapes, monitor inbreeding depression, and track the source of tigers and tiger parts confiscated from illegal trade.

Duration and locations: 12 years, Tenasserim-WEFCOM as the tiger source site and DP-KY as the potential source site and other protected areas for a nationwide survey.

Activities necessary to accomplish this objective:

Activity 38: Strengthen long-term tiger ecology study in priority

landscapes, especially to determine maximum densities that can be supported in the landscapes to meet recovery targets.

Activity 39: Determine genetic structure of wild tigers at the population level and of captive tigers.

Khao Nang Rum Wildlife Research Station, WCS-Thailand Program

Objective 13: Ensure that relevant information for tiger conservation is well managed and available to inform strategy and planning

Challenge: Relevant information for tiger conservation is mostly scattered and has not been efficiently used to inform managers.

Opportunity: Information on tiger conservation in WEFCOM has been advanced and well organized over the last 5 years and the Wildlife Conservation Office of DNP has established an information center at the headquarters in Bangkok to be a center for smart patrol database.

Expected outcome: The government of Thailand has a high quality central database to cooperate with other organizations on tiger conservation.

Duration and locations: 12 years, DNP headquarters in Bangkok.

Activity necessary to accomplish this objective:

Activity 40: Develop information structure that facilitates compilation of national tiger related data for improvement of tiger conservation.

Priority action 4: Promoting education, awareness, and public participation

Objective 14: Convey tiger conservation-related messages to a diverse policy makers, and politicians.

Challenge: Most Thai public and policy makers do not perceive tigers as national pride and symbol as elephants.

Opportunity: Tiger can be used as an iconic species if promoted properly

and if enough information on the situation of tigers in WEFCOM is available to motivate public and other sectors in the community.

Expected outcome: Thai society gives strong support for tigers and wildlife conservation and natural resource management.

Duration and locations: 12 years, schools and communities around WEFCOM and DP-KY landscapes and Thai society at large.

Activities necessary to accomplish this objective:

Activity 41: Public campaigns on wild tiger conservation in local schools and communities around priority landscapes using innovative tools and impact monitoring system.

Activity 42: Deliver the message of tiger conservation through mainstream media channels.

Activity 43: Produce quality publications that contain information on tigers and their roles in the ecosystem to the public.

Objective15: Ensure that basic concepts of the tiger's ecological and cultural significance become part of Thailand's standard curriculum at several educational levels

Challenge: Unlike elephants, the story of the tiger's ecological and cultural significance has not been incorporated in any curriculum at any educational level.

Opportunity: Enough information is now available about tigers and their significance to Thailand's ecological system to be part of the curriculum at many levels.

Expected outcome: The government of Thailand has a high quality central database to cooperate with other organizations on tiger conservation.

Duration and locations: 12 years, national level.

Activity necessary to accomplish this objective:

Activity 44: Work with the Ministry of Education to include specific tiger-related learning goals in both primary and secondary standard curricula.

Objective16: Ensure that the co-benefits of tiger landscape conservation are understood and appreciated

Challenge: The ecosystem services and benefits to society that accrue specifically from tiger lanscapes and potential tiger landscapes in Thailand have not been widely acknowledged.

Opportunity: Reliable techniques to quantify ecosystem service values have been used and the results can lead to greater attention from policy makers and other sectors in society. *WCS-Thailand Program*

Expected outcome: More support for tiger conservation from other sectors of the society.

Duration and locations: 12 years, national level.

Activity necessary to accomplish this objective:

Activity 45: Quantify ecosystem service values and use the information to communicate the broader values of tiger conservation landscapes.

Priority action 5: Strategic financing for tiger conservation

Objective17: Identify the costs of effective tiger conservation, current expenditures, and efficiency of these expenditures

Challenge: All current tiger and potential tiger sites and landscapes in Thailand still do not have

sufficient budgets and manpower to conserve and recover wild tigers.

Opportunity: There are examples of tiger conservation costings from other tiger range countries and other successful projects that can be used to estimate the costs of tiger conservation in Thailand.

Expected outcome: The real cost of wild tiger conservation is understood and the budget is increased.

Duration and locations: 12 years, national level.

Activity necessary to accomplish this objective:

Activity 46: Baseline study of protected area costs and efficiency of current expenditures.

Objective18: Make use of large scale funding opportunities such as GEF 5, REDD,and other programs to fund tiger conservation efforts

Challenge: Large scale funding sources such as GEF-5, REDD, and others are not tiger-focused enough to provide funding; addressing too many non-impact activities can detract energy and resources from true tiger conservation and recovery; and the government processes associated with developing large scale funding opportunities takes a long time to go through the government process.

Opportunity: If prepared properly and funded, large scale funding sources can sustain important activities until results of impacts are known.

Expected outcome: Opportunity for funding is expanded

Duration and locations: 12 years, Tenasserim-WEFCOM as the tiger source site and DP-KY as the potential source site.

Activities necessary to accomplish this objective:

Activity 47: Utilize GEF-5 programmatic funding opportunity to secure additional national funding for tiger landscape conservation support.

Activity 48: Develop full REDD+ funding strategy for the Dawna Tenasserim landscape.

Objective19: Develop sustainable funding mechanisms

Challenge: Tiger conservation and recovery take a long time before results start to be seen and in many areas funding sustainability is the key problem that has led to failure.

Opportunity: In Thailand the government budget is the most sustainable mechanism for tiger conservation and recovery. However, the budget allocation and expenditure systems need to be overhauled under good governance, which is transparent and monitorable.

Expected outcome: Opportunity for funding is expanded and sustained.

Duration and locations: 12 years, Tenasserim-WEFCOM as the tiger source site and DP-KY as the potential source site.

Activities necessary to accomplish this objective:

Activity 49: Identify potential payment for ecosystem services mechanism and develop pilot projects to demonstrate their values.

Activity 50: Establish a trust fund for conservation activities in priority landscapes.

Activity 51: Enhance ecotourism opportunities in and around tiger landscapes and ensure that revenues flow more directly to tiger conservation efforts.

Policy Change to Support the Objectives

To accomplish Thailand Tiger Action Plan, related agencies should implement following actions:

- Develop policies on promotion, salaries and social security systems for protected area staff and park rangers
- Encourage policy makers to develop policies on career paths for superintendents of protected areas (national parks and wildlife sanctuaries) for effectiveness and continuity of the work quality
- Up list tigers to the reserved species under the Wild Animal Reservation and Protection Act B. E. 2535 (1992)
- Strengthen enforcement of wildlife crime under the Wild Animal Reservation and Protection Act B.E.2535 (1992) to make sure that convicted offenders receive the highest penalty of Wildlife Laws and related legislations.

Action Plan Implementation

To be successful in recovering wild tiger populations following the vision, goals, priority actions, objectives, and activities mentioned in this plan, the Ministry of Natural Resources and Environment needs to set up a National Tiger Conservation Committee. The members of the committee should come from government agencies, education institutes and NGOs involved with tiger conservation and recovery under the action plan. This committee will have the following activities:

1. Meet annually to review progress of the National Tiger Action Plan as follows:

   - Review progress of key activities, objectives and goals of priority actions with focusing on the tiger source site landscape of Tenasserim-WEFCOM and potential site landscape of DP-KY
   - Evaluate the effectiveness of activities under each priority action
   - Adjust and adapt approaches to fulfill the objectives and priority actions
   - Set up progress targets and a timetable of key activities
   - Consult with experts and scientists on progress toward tiger population goals
   - Prepare information for upcoming meetings on tiger conservation.

2. Convene an annual meeting with stakeholders to report the progress of the action plan.

3. Produce and circulate an annual tiger conservation report.

APPRECIATIVE REMARKS
for
Political Leadership on Tiger Conservation in Thailand
H. E. SUWIT KHUNKITTI
Minister of Natural Resources and Environment

H.E. Suwit Khunkitti is a well renowned public figure in Thai society who has served the country in various important public service and ministerial positions, including Deputy Prime Minister. He has been a prominent conservationist in Thailand for many years, having received the 1995 Best Conservationist award from the Siam Environmental Society. More recently, he was the recipient of the 2009 J. Paul Getty Award for Conservation Leadership, which was deeply appreciated by those who served under him. Since then, the international community has supported his policies to strengthen tiger and wildlife conservation in local and international arenas.

Thailand's first Tiger Action Plan was launched by H.E. Khunkitti during his first term as Minister of Natural Resources and Environment in 2004. This plan directed Thailand to work in cooperation with government, academic, and NGO partners to improve the conservation of tigers and other wildlife. The ASEAN Wildlife Law Enforcement Network (ASEAN-WEN) also was the initiative from his broad vision by working closely with ASEAN countries to suppress the cross-border trade of wildlife in CITES CoP13.

Since returning to MoNRE as minister in 2009, H.E. Khunkitti has given strong support to the Global Tiger Initiative (GTI) and overseen the hosting of two important international tiger conservation meetings – which represent two important recommendations; The Pattaya Manifesto on Combating Wildlife Crime in Asia and Hua Hin Declaration on Tiger Conservation as a result of a ministerial conference on tiger conservation. From these gatherings came clear directives for greater efforts in the area of international cooperation to achieve stated goals in tiger conservation.

Thus, under H.E. Khunkitti's leadership, Thailand is now an active member of the global tiger conservation community. Its recent commitments include measures to increase by more than 50% the tiger populations in priority tiger-source sites; the establishment of the Regional Tiger Conservation and Research Center in Huai

Kha Khaeng Wildlife Sanctuary; and the strengthening of ASEAN-WEN, including its expansion to include the greater Asia region.

The 2nd Thailand Tiger Action Plan you are holding is another important outcome of H.E. Khunkitti's leadership. On behalf of the people working for wildlife, from policy-level down to park rangers battling wildlife crimes at the frontline, the Department of National Parks, Wildlife and Plant Conservation would like to give its sincere appreciation to H. E. Suwit Khunkitti for his leadership in tiger conservation in Thailand.

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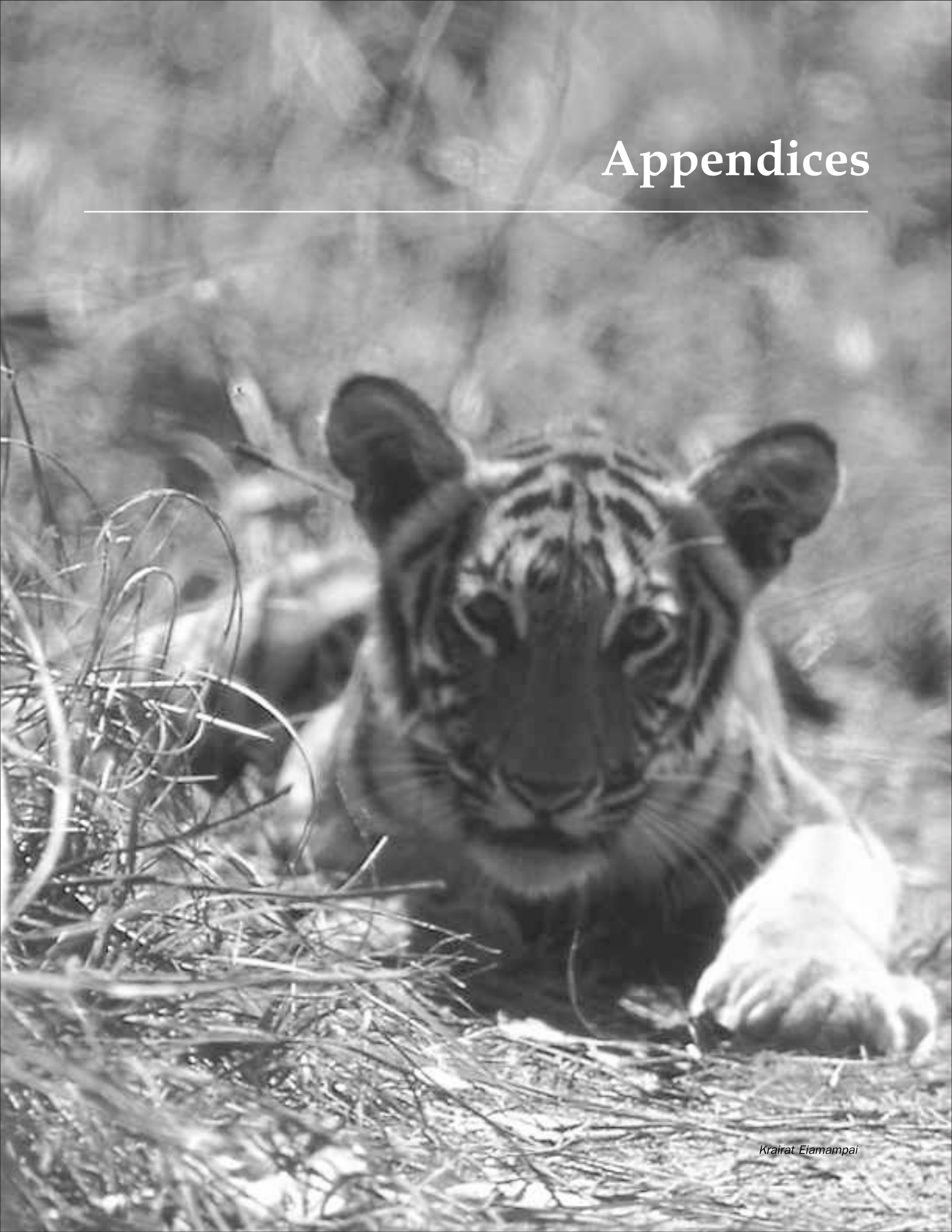
Appendices



Krairat Eiamampai

Appendix 1 Actions, Indicators, and Timelines for Tiger Conservation Actions

	Action	Indicator	Means of Verification	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
1	**Strengthening direct conservation action and enforcement**														
1.1	**Promote conservation efforts at the scale of entire tiger populations (e.g., forest complexes and associated corridors)**														
1.1.1	Strengthen and standardize "Smart patrol system" in protected areas of current tiger source and potential source sites, including Tenasserim – WEFCOM and DP-KY.	Numbers of protected areas with MIST-based smart patrol system;patrol efforts (patrol days, patrol distance, patrol coverage);threat distribution and trend	Monthly reports; meeting minutes	x	x	x	x	x	x	x	x	x	x	x	x
1.1.2	Increase the number of competent park ranger teams patrolling in each protected area of priority landscapes up to the level that can effectively secure tigers and their prey.	Numbers of park rangers in HKK-TY and KY-TL.	Protected area budget and human resources; transparent system of hiring park rangers	x	x	x	x	x	x	x	x	x	x	x	x
1.1.3	Strengthen wildlife crime units and informant networks around Tenasserim – WEFCOM and DP-KY Forest Complex to suppress local demands on wild meat and illegal wildlife trade and help apprehend wildlife criminals around protected areas.	Numbers of wildlife crime units in PAAO 1, 3, 7, 12, 14;data quality in wildlife trade database; enforcement cases	Monthly reports	x	x	x	x	x	x	x	x	x	x	x	x
1.1.4	Work with district attorneys and judges to ensure substantial punishment on wildlife crime against tigers and other large ungulates.	Proportion of cases resulting in conviction;balance applications of penalty ranges	Conviction reports; police reports	x	x	x	x	x	x	x	x	x	x	x	x
1.1.5	Overhaul the park ranger system to a higher living and working standard, and provide rewards and incentives to encourage patrolling (e.g., patrolling budgets) and other significant morale boosting programs such as performance-based promotions.	Better performance-based compensation and promotion;increase in base salaries and benefits;funds for ranger welfare in priority landscapes	Job performances; regular protected areas reports submitted to DNP	x	x	x	x	x	x	x	x	x	x	x	x
1.1.6	Apply landscape-scale ecological and development models for tiger conservation and engage stakeholders in development sectors (i.e., roads, oil and gas, mining, power) to minimize and mitigate impacts in sectoral activities on tiger habitats.	Numbers of management approaches and development models applied at the landscape scale	DNP reports	x	x	x	x	x	x	x	x	x	x	x	x

Appendix 1 Actions, Indicators, and Timelines for Tiger Conservation Actions (con't)

	Action	Indicator	Means of Verification	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
1.2	**Provide long-term support for tiger habitat restoration activities**														
1.2.1	Promote use of controlled burning in potential and manageable parts of priority landscapes to maintain grassland for ungulate recovery.	Areas for control burned;changes in ungulate use of the burned areas	Maps and areas managed using fires	x	x	x	x	x	x	x	x	x	x	x	x
1.2.2	Prevent and suppress fires effectively in evergreen forest areas in priority landscapes to provide good cover and watersheds for tigers and wildlife.	Areas with fire controlled	Satellite image reports	x	x	x	x	x	x	x	x	x	x	x	x
1.2.3	Strengthen the reintroduction program of ungulate prey with the ex-situ succeeded species (i.e., sambars, eld's deer, hog deer) in suitable habitats.	Species, numbers, and locations;numbers of reintroduced animals surviving after reintroductions;breeding success	Reintroduction plan;monitoring system; breeding and reintroduction reports	x	x	x	x	x	x	x	x	x	x	x	x
1.2.4	Maintain natural and existing artificial water sources that benefit tigers and ungulates es-pecially during the drought periods in priority landscapes.	Numbers of water sources;demonstrated increase in prey numbers	Report on monitoring results of wildlife use of water sources and salt licks	x	x	x	x	x	x	x	x	x	x	x	x
1.2.5	Establish a system to control invasive species (e.g., *Lantana camara, Mimosa pudica*) in the priority landscapes.	New areas where invasive species detected	Project surveys;protected areas reports	x	x	x	x	x	x	x	x	x	x	x	x
1.2.6	Identify priorities for corridor and habitat restoration.	Areas identified for corridor and habitat restoration	Maps of corridors	x		x		x		x		x		x	x
1.3	**Ensure that government policy of protecting tiger habitats from development threats, as committed to in the Hua Hin declaration, is followed**														
1.3.1	Ensure that no major infrastructure development occurs in core tiger habitats.	Numbers of major development project rejected	Government reports	x	x	x	x	x	x	x	x	x	x	x	x
1.3.2	Ensure that infrastructure development in corridors and buffer zones conform with Smart Green Infrastructure designs to ensure minimal impacts to tiger habitats and maintain land-scape connectivity.	Number of green infrastructure protects in cooridors and buffer zones	Government reports	x	x	x	x	x	x	x	x	x	x	x	x

Appendix 1 Actions, Indicators, and Timelines for Tiger Conservation Actions (con't)

	Action	Indicator	Means of Verification	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
1.4	**Encourage community participation and cooperation in protected area conservation activities**														
1.4.1	Strengthen and build wildlife conservation network around the priority landscape to enhance tiger and wildlife conservation in the priority areas.	Numbers of wildlife conservation network established; numbers and groups of people trained as volunteers	Wildlife conservation actions participated by members of networks;projects conducted by volunteers	x	x	x	x	x	x	x	x	x	x	x	x
1.4.2	Provide Protected Area Committees (PAC) and Community Committees (CC) with quality information (e.g., data from Smart Patrol System) on which to base threat reduction decisions and activities.	Meeting frequency and resolutions from the meeting;successful cases of particaptorial management approaches	PAs reports; PAC reports;CC reports	x	x	x	x	x	x	x	x	x	x	x	x
1.5	**Support local communities in developing sustainable economies that reduce dependence on forest resources**														
1.5.1	Link communities with agricultural science institutes and agencies to promote agro-forestry in buffer zone areas around priority landscapes to reduce collection of Non Timber Forest Producteds (NTFPs) inside Protected Areas (PAs).	Incomes from agro-forestry products (eg., bamboo shoots, mushrooms)	PAs Reports	x	x	x	x	x	x	x	x	x	x	x	x
1.5.2	Develop wildlife-based ecotourism with concrete benefit sharing with communities in appropriate areas in and around PAs.	Numbers of projects, areas, and activities;revenue flowing to the communities	DNP reports on wildlife-based ecotourism projects; reports on revenues from Ministry of Interior	x	x	x	x	x	x	x	x	x	x	x	x
1.6	**Facilitate international cooperation in tiger conservation efforts**														
1.6.1	Strengthen enforcement capacity of Thailand's CITES programs with better interagency-collaboration and stronger protocols and impact monitoring systems on wildlife trade.	Transparent permit system;numbers of cases resulting from interagency-collaboration; active responses from CITES checkpoints and interagency collaboration	CITES Management Authority of Thailand biennual reports;DNP annual reports and statistics	x	x	x	x	x	x	x	x	x	x	x	x
1.6.2	Strengthen and sustain capacity of ASEAN-WEN.	Enforcement monitoring system; positive response from relevant authorities from ASEAN countries	Progress and annual reports of ASEAN-WEN	x	x	x	x	x	x	x	x	x	x	x	x

Appendix 1 Actions, Indicators, and Timelines for Tiger Conservation Actions (con't)

	Action	Indicator	Means of Verification	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2012
1.6.3	Strengthen bi-lateral cooperation with Cambodia, Laos, Malaysia and Myanmar for transboundary enforcement and monitoring and research.	Numbers of collaboration projects, areas, and activities	Biennual reports of CITES Management Authority of Thailand; DNP annual reports	x	x	x	x	x	x	x	x	x	x	x	x
1.7	**Strengthen national laws, policies, and enforcement of tiger related crimes**														
1.7.1	Strengthen enforcement on wildlife crime under the Wild Animal Reservation and Protection Act B.E.2535 (1992) to make sure that convicted offenders receive the highest penalty of Wildlife Laws and related legislations.	Numbers of offenders convicted in a range of penalties	Court decisions; DNP reports; DNP Statistics	x	x	x	x	x	x	x	x	x	x	x	x
1.7.2	Strengthen Thailand-WEN information sharing capacity.	Effective monitoring database on performance; positive responses from relevant authorities; enforcement mechanisms developed; information shared	Thailand-WEN annual reports; reports on enfocement actions	x	x	x	x	x	x	x	x	x	x	x	x
1.7.3	Strengthen investigative capacity and judiciary effectiveness in wildlife crime cases.	Prosecution and conviction cases; increasing success in prosecution of cases; capacity building training held	Court decisions;training materials; DNP anuual reports	x	x	x	x	x	x	x	x	x	x	x	x
1.7.4	Strengthen communication campaigns on wild tiger conservation.	Wild tiger conservation discussed at meetings; awareness survey; capacity building trainings held	Meeting minutes;campaign materials;awareness survey results	x	x	x	x	x	x	x	x	x	x	x	x
1.7.5	MoU with military, police, Ministry of Interior, Ministry of Education to be strengthened and implemented for better collaboration and training for enforcement.	Numbers of cooperation projects under the MoU; meetings and dialogues to work with military, police, Ministry of Interior, Ministry of Education	MoNRE annual reports	x	x	x	x	x	x	x	x	x	x	x	x

Appendix 1 Actions, Indicators, and Timelines for Tiger Conservation Actions (con't)

	Action	Indicator	Means of Verification	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
1.8	**Support national and international efforts to manage captive tigers responsibly**														
1.8.1	Design and enforce the control programs for captive breeding of tigers in legal tiger zoos with a captive tiger database tracking records.	Captive tiger database established and run effectively with effective tiger inspection teams.	DNP's reports on status of captive tigers	x	x	x	x	x	x	x	x	x	x	x	x
1.8.2	Discourage illegal activities involving captive tigers, using effective public campaigns which highlight the impacts of tiger conservation.	Effective enforcement on zoos allowed for captive tigers but violating the law; information in the public domain	Enforcement records in DNP annual reports; media pick-ups	x	x	x	x	x	x	x	x	x	x	x	x
1.8.3	Public campaigns showing the difference between wild & captive tiger conservation.	Strong campaign and clear public understanding on tiger issues;information in the public domain	DNP annual reports;media pick-ups	x	x	x	x	x	x	x	x	x	x	x	x
2	**Building capacity based on successful models**														
2.1	**Establish a Regional Tiger Conservation and Research Center at Huai Kha Khaeng Wildlife Sanctuary**														
2.1.1	Designate staff and design an administrative structure to run the center with shared experiences and administrations.	Clear structure of shared administration established	MoNRE and DNP executive orders	x	x	x	x	x	x	x	x	x	x	x	x
2.1.2	Ensure that the training center has sufficient facilities and equipment to facilitate high quality training in management, enforcement, and research to serve both Thailand and the region.	Successful pilot training courses delivered; a number of projects participated by tiger range countries	DNP annual reports	x	x	x	x	x	x	x	x	x	x	x	x
2.1.3	Establish technical and enforcement-related curricula that will prepare participants to meet protected area management standards.	A curriculum standard for tiger protected area managers designed and used; a number of protected area managers passed the curricuala	DNP executive orders to regulate a curriculum standard on tiger protected areas; DNP Training records	x	x	x	x	x	x	x	x	x	x	x	x

Appendix 1 Actions, Indicators, and Timelines for Tiger Conservation Actions (con't)

	Action	Indicator	Means of Verification	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
2.2	**Ensure national training capacity can deliver high quality tiger conservation training at all levels**														
2.2.1	Strengthen the local instructors capacity for conducting training courses for tiger research and conservation for Thai and international audience.	Training for trainer courses are well designed and launched	DNP annual reports	x	x	x	x	x	x	x	x	x	x	x	x
2.2.2	Establish a national standard as sufficient resources for tiger conservation training.	National standard is agreed and published	DNP annual reports	x	x	x	x	x	x	x	x	x	x	x	x
3	**Monitoring, research, and information management**														
3.1	**Monitor tiger and prey populations in priority landscapes**														
3.1.1	Maintain and establish high standard annual population monitoring systems for tigers and their prey in tiger sources and potential source sites in the priority landscapes.	System of camera trapping and transect for tiger and prey population monitoring established and annually run with rigorous designs	DNP reports on population monitoring systems	x	x	x	x	x	x	x	x	x	x	x	x
3.1.2	Establish landscape scale occupancy monitoring systems for tigers and prey throughout the two priority landscapes.	System of occupancy monitoring for tiger and prey established and run	DNP reports on landscape scale occupancy monitoring systems	x	x	x	x	x	x	x	x	x	x	x	x
3.1.3	Implement a national-wide survey and reporting system on tigers and prey conditions based on scientific methods.	National-wide survey system established and run with rigorous design	DNP reports on a national-wide survey and reporting system on tigers and prey conditions	x	x	x	x	x	x	x	x	x	x	x	x
3.2	**Maintain long-term tiger and prey ecology research in priority landscapes**														
3.2.1	Strengthen long-term tiger ecology studies in priority landscapes, especially to determine maximum densities that can be supported in the landscapes to meet recovery targets.	Tiger and prey ecological studies continued with well designed	Reports and publications on long-term tiger ecology studies	x	x	x	x	x	x	x	x	x	x	x	x
3.2.2	Determine the genetic structure of wild tigers at the population and of captive tigers.	A systems for collecting tiger scats or hair samples established and run efficiently	Genetic structures existed and updated regularly	x	x	x	x	x	x	x	x	x	x	x	x
3.3	**Ensure that relevant information for tiger conservation is well managed and available to inform strategy and planning**														
3.3.1	Develop information structure that facilitates compilation of national tiger related data for improvement of tiger conservation.	Data consolitated from all tiger protected areas easily accessed and used; mechanisms developed	Information structures existed and updated regularly; published manuals	x	x	x	x	x	x	x	x	x	x	x	x

Appendix 1 Actions, Indicators, and Timelines for Tiger Conservation Actions (con't)

	Action	Indicator	Means of Verification	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
4	**Education, awareness, and public participation**														
4.1	**Convey tiger conservation-related messages to a diverse Thai public, policy makers, and politicians**														
4.1.1	Public campaigns on wild tiger conservation in local schools and communities around priority landscapes using innovative tools and impact monitoring system.	Public campaigns on wild tiger conservation designed and used	DNP fact sheets and publications	x	x	x	x	x	x	x	x	x	x	x	x
4.1.2	Deliver the message of tiger conservation through mainstream media channels.	Long-term strategic communication programs developed; publications in magazines or newspapers; public presentations	DNP reports on landscape scale occupancy monitoring systems	x	x	x	x	x	x	x	x	x	x	x	x
4.1.3	Produce quality publications that contain information on tigers and their roles in the ecosystem to the public.	Publications disigned and produced among public at large; information in the public domain	Tiger publications; media pick-ups	x	x	x	x	x	x	x	x	x	x	x	x
4.2	**Ensure that basic concepts of the tiger's ecological and cultural significance become part of Thailand's standard curriculum at several educational levels**														
4.2.1	Work with Ministry of Education to include specific tiger-related learning goals in both primary and secondary standard curricula.	Tiger conservation and related-topics included in the school curriculum	Reports of the MoU implementation between MoNRE and MoE	x	x	x	x	x	x	x	x	x	x	x	x
4.3	**Ensure that the co-benefits of tiger landscape conservation are understood and appreciated**														
4.3.1	Quantify ecosystem service values and use the information to communicate the broader values of tiger conservation lanscapes.	Ecosystem service values quantified;information in the public domain	DNP ecosystem services publications; media production broadcasted	x	x	x	x	x	x	x	x	x	x	x	x
5	**Strategic financing for tiger conservation**														
5.1	**Identify the costs of effective tiger conservation, current expenditures, and efficiency of these expenditures**														
5.1.1	Baseline study of protected area costs and efficiency of current expenditures.	Cost of conservation identified	Study reports	x	x	x	x	x	x	x	x	x	x	x	x
5.2	**Make use of large scale funding opportunities such as GEF 5, REDD, other programs to fund tiger conservation efforts**														
5.2.1	Utilize GEF 5 programmatic funding opportunities to secure additional national funding for tiger landscape conservation support.	Numbers of proposals submitted	Numbers of proposals funded	x	x	x	x	x	x	x	x	x	x	x	x

Appendix 1 Actions, Indicators, and Timelines for Tiger Conservation Actions (con't)

	Action	Indicator	Means of Verification	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2012
5.2.2	Develop full REDD+ funding strategy for the Dawna Tenasserim Landscape.	Funding strategy developed; numbers of proposals submitted	Numbers of proposals funded	x	x	x	x	x	x	x	x	x	x	x	x
5.3	**Develop sustainable funding mechanisms**														
5.3.1	Identify potential payment for ecosystem services mechanism and develop pilot projects to demonstrate their values.	Ecosystem services mechanisms identified; numbers of projects, areas, and activities	Numbers of pilot projects implemented; DNP project reports	x	x	x	x	x	x	x	x	x	x	x	x
5.3.2	Establish a Trust Fund for conservation activities in priority landscapes.	Trust Fund established	Volume and duration of financial support on tiger project	x	x	x	x	x	x	x	x	x	x	x	x
5.3.3	Enhance ecotourism opportunities in and around tiger landscapes and ensure that revenues flow more directly to tiger conservation efforts.	Ecotourism pilot projects developed; proposal submitted	Ecotourism pilot projects tested and applied in and around tiger landscapes	x	x	x	x	x	x	x	x	x	x	x	x

Appendix 2 Estimation of Tiger Population in Thailand[1] **Remark: Tiger density in 25 protected areas.**

Protected Areas	Area (km^2)	Abundance			Population
		High	Moderate	Low	
1. Western Forest Complex					
– Huai Kha Khaeng Wildlife Sanctuary	2817	√			77–59
– Thungyai Naresuan (West) Wildlife Sanctuary	2117		√		31–16
– Thungyai Naresuan (East) Wildlife Sanctuary	1572		√		13–9
– Umpang Wildlife Sanctuary	2587			√	27–23
– Mae Wong National Park	896			√	
– Erawan National Park	530			√	
– Khuan Si Nakharin National Park	1843			√	
– Sai Yok National Park	962			√	
2. Kaeng Krachan Forest Complex					
– Kaeng Krachan National Park	2020*		√		20–14
– Kui Buri National Park	982		√		9
3. Dong phayayen–Khao Yai Forest Complex					
– Khao Yai National Park	2260			√	9–7
– Thap Lan National Park	1805*		√		26–18
– Pang Sida National Park	859		√		
4. Hala–Bala Forest Complex					
– Bang Lang National Park	289		√		7–5
– Hala Bala Wildlife Sanctuary	422		√		
5. Phu khieo–Nam Nao Forest Complex					
– Phu–khieo Wildlife Sanctuary	1571			√	10–9
– Nam Nao National Park	975			√	
6. Doi Phu Kha–Mae Yom Forest Complex					
– Doi Pha Chang Wildlife Sanctuary	583			√	2
7. Srilanna–Khun Tan Forest Complex					
– Doi Luang National Park	1212			√	6–5
– Khun Chae National Park	287			√	
8. Lum Nam Pai–Salawin Forest Complex					
– Mae–Yuam Fang Kwa Wildlife Sanctuary	292			√	8–7
– Chiang Dao National Park	1146			√	
– Salawin National Park	735			√	
9. Mae Ping–Om Koi Forest Complex					
– Om Koi Wildlife Sanctuary	1226			√	5–4
10. Khao Luang Forest Complex					
– Khao Luang National Park	596			√	2
Total					**252–189**

Tiger Abundance – High

Huai Kha Khaeng Wildlife Sanctuary 2.4 ± 0.32 tiger/100 Km^2 (Khao Nang Rum Wildlife Research Station, 2009)

Tiger Abundance – Moderate

Thungyai Naresuan (West) Wildlife Sanctuary 1.1 ± 0.35 tiger/100 Km^2 (Khao Nang Rum Wildlife Research Station, 2009)

Thungyai Naresuan (East) Wildlife Sanctuary 0.68 ± 0.15 tiger/100 Km^2 (Khao Nang Rum Wildlife Research Station, 2009)

Tiger density (other areas) = 1 tiger/100–150 km^2

Tiger Abundance – Low

Tiger density = 1 tiger/250–300 km^2

* **estimated protected area excluded the area of human settlement.**

Appendix 3 Encounter Rate of Tiger Signs in Thailand's Protected Areas[1] **Forest Complex**

1. Lum Nam Pai-Salawin	2. Salawin National Park	0.5
	3. Mae-Yuam Fang Kwa Wildlife Sanctuary	0.5
2. Srilanna-Khun Tan	1. Khun Chae National Park	1.1
	2. Doi Luang National Park	1.6
3. Doi Phu Kha-Mae Yom	1. Doi Pha Chang Wildlife Sanctuary	1.1
4. Mae Ping-Om Koi	1. Om Koi Wildlife Sanctuary	*
6. Phu khieo-Nam Nao	1. Nam Nao National Park	0.7
	2. Phu-khieo Wildlife Sanctuary	0.4
9. Dong phayayen-Khao Yai	1. Khao Yai National Park	0.5
	2. Thap Lan National Park	3.7
	3. Pang Sida National Park	3.9
11. Western	1. Khuan Sri Nakharin National Park	0.4
	2. Erawan National Park	0.8
	3. Thungyai Naresuan (West) Wildlife Sanctuary	25.8
	4. Thungyai Naresuan (East) Wildlife Sanctuary	8.3
	5. Huai Kha Khaeng Wildlife Sanctuary	14.3
	6. Umpang Wildlife Sanctuary	1
	7.Sai Yok National Park	**
	8. Mae Wong National Park	*
12. Kaeng Krachan	1. Kaeng Krachan National Park	5.2
	2. Kui Buri National Park	1.6
15. Khao Luang	1. Khao Luang National Park	0.6
17. Hala-Bala	1. Bang Lang National Park	9.5
	2. Hala Bala Wildlife Sanctuary	4.1

Remark[1] Data between 2004-2007

* Reported by Park Rangers (2009)

** Data from Camera Trap (2006)

Protected Areas	Study Period	Trap night	Remark	No. of Tiger	Estimated Density	Remark
1. Huai Kha Khaeng WS[1]	2010 2009	2935 2731	39	39	2.4±0.32 2.39±0.29	(KNR,pers. Comm.) (KNR,2009)
2. Thung Yai WS-W[2]	2009	629	7		1.1±0.35	(KNR,2009)
Thung Yai WS -E[2]	2007	629	7		0.68±0.15	(KNR,2009)
3. Kui Buri NP[3]	2007	1055	2[A]	0.8		95%CI=3-10
	2009	1458	2[A]	1		95%CI=4-10
4. Kaeng KraChan NP[4]	2001	809	4		2.8(SE0.8)	
5. Thap Lan NP[5]	2008-2010		5552	8		
6. Khao Yai NP[6]	2003-2006		6172	0	0	
7. Klong Saeng WS[7]	1997-2000		2690	0	0	
	Dec03-Apr04	528	0	0		
8. Mae Nam Pachi[8]	May-Sep2005	540	0	0		

A "Number of Tiger" reported here are during capture-recapture sampling period, but since 2007 WWF has photographed 9 individual tigers in the park, including 3 cubs.

[1, 2] - (Khao Nang Rum Research Station, 2009; WCS-Thailand Program, 2007; WCS-Thailand Program, 2008; WCS-Thailand Program, 2009) [3]- (WWF Thailand, 2008)