Biodiversity in Malaysia: We are all in this together.

1.0 Introduction

Biodiversity is the variety of life. It can be studied on many levels. At the highest level, you can look at all the different species on the entire Earth. On a much smaller scale, you can study biodiversity within a pond ecosystem or a neighborhood park. Identifying and understanding the relationships between all the life on Earth are some of the greatest challenges influence. (what is biodiversity?, 1996)

Most people recognize biodiversity by species. A species is a group of living organisms that can interbreed. Examples of species include blue whales, white-tailed deer, white pine trees, sunflowers and microscopic bacteria that you cannot even see with your eye. Biodiversity includes the full range of species that live in an area.

Figure 1.0: example of biodiversity within a rainforest (Amsel)

Let's look at the species biodiversity within a rainforest (figure 1.0). At first glance, we can identify different plants, including cattails and mossy fern. If we wait a while, we might be able to spot a garter snake, a butterfly or maybe a monkey. With a closer look, you can see invertebrates and worms under leaves, on grasses and in the river.

1.1 Biodiversity is more than just a species

Species diversity is only one part of biodiversity. To properly catalogue all the life on Earth, we also have to recognize the genetic diversity that exists within species as well as the diversity of entire habitats and ecosystems.

Genetic Biodiversity is the variation in genes that exists within a species. A helpful way to understand genetic diversity is to think about dogs. All dogs are part of the same species, but their genes can dictate whether they are Chihuahua or a Great Dane. There can be a lot of

variation in genes, just think about all the colors, sizes, and shapes that make up the genetic diversity of dogs.

Ecological Biodiversity is the diversity of ecosystems, natural communities and habitats. In essence, it's the variety of ways that species interact with each other and their environment. The forests of Maine differ from the forests of Colorado by the types of species found in both ecosystems, as well as the temperature and rainfall. These two seemingly similar ecosystems have a lot of differences that make them both special.

1.2 Biodiversity Facts

Researchers have estimated that there are between 3 - 30 million species on Earth, with a few studies predicting that there may be over 100 million species on Earth. Currently, we have identified only 1.7 million species, so we have a long way to go before we can come close to figuring out how many species are on Earth! (what is biodiversity?, 1996)

There is more biodiversity within tropical ecosystems than temperate or boreal ecosystems. Tropical rainforests have the most diversity.
The most diverse group of animals are invertebrates. Invertebrates are animals without backbones, including insects, crustaceans, sponges, scorpions and many other kinds of organisms. Over half of all the animals already identified are invertebrates. Beetles are some of the most numerous species.
Science has so much more to learn about the biodiversity of microscopic organisms like bacteria and protozoa.

1.3 Biodiversity Facts in Malaysia

Malaysia is one of the world's mega-diverse countries. It is also ranked 12th in the world, according to the National Biodiversity Index, which is based on estimates of country richness and endemism in four terrestrial vertebrate classes and vascular plants.

Malaysia has undergone rapid economic development since independence which is attributed to the utilization of the country's rich natural resources and development of human capital. Based on 2012 statistics, approximately 60% of the country's total land area is still forested, including permanent reserved forest (PRF), state land forests, national parks, and wildlife and bird sanctuaries. This is in line with Malaysia's commitment to maintain at least 50% of forest and tree cover in perpetuity, as pledged at the 1992 Rio Earth Summit. In addition, a total of 10.6% of Malaysia's land area has been designated as terrestrial protected areas. The remaining land uses comprise agricultural crops, rubber plantations, oil palm plantations, urban and other uses. Malaysia has an estimated 15,000 species of vascular plants, 306 species of mammals, 742 species of birds, 242 species of amphibians, 567 species of reptiles, over 449 species of freshwater fish, over 500 species of marine fish and more than 150,000 species of invertebrates.

Marine protected areas represent a wide range of habitats, including coral reefs, sea grasses and mangrove forests. As of 2013, the Department of Marine Park Malaysia manages 248,613 hectares of marine protected areas, which include 42 islands in Peninsular Malaysia and federal territories that are gazette as marine parks. Another 32 islands are located within the area covered by the marine park waters. Almost 20% of Peninsular Malaysia and federal territories is located within the area managed by the Department of Marine Park Malaysia. Marine protected areas cover 73,793 hectares in Sabah and are managed by Sabah Parks. In Sarawak, marine protected areas are managed by the Sarawak Forestry Department and cover 234,362.4 hectares.

Based on the 2008 IUCN Red List, Malaysia is home to 1,141 threatened species, including plants and animals. (biodiversity in malaysia, 2006)

Species group	Total species richness	Number of species endemic to Malaysia	Number of species shared with other countries
Mammals	287	28	259
Birds	501	9	492
Reptiles	270	70	200
Amphibians	158	57	101
Higher Plants	15,000	2,700	12,300
Total	6,421	2,199	4,222

The species richness and endemism of Malaysia is of major global importance. It ranks 21st among all countries in absolute diversity and 20th when adjusted to the country's area. Peninsular Malaysia has a rich flora and fauna with large Asian components small Australian components. Deforestation and forest degradation have significantly affected wildlife populations especially in the lowlands. (Malaysian Biodiversity Profile)

2.0 The Importance of Biodiversity

Biodiversity is extremely important to people and the health of ecosystems. Biodiversity allows us to live healthy and happy lives. It provides us with an array of foods and materials and it contributes to the economy. Without a diversity of pollinators, plants, and soils, our supermarkets would have a lot less produce. Most medical discoveries to cure diseases and lengthen life spans were made because of research into plant and animal biology and genetics. Every time a species goes extinct or genetic diversity is lost, we will never know whether research would have given us a new vaccine or drug.

Biodiversity is an important part of ecological services that make life livable on Earth. They include everything from cleaning water and absorbing chemicals, which wetlands do, to providing oxygen for us to breathe-one of the many things that plants do for people. (biodiversity in malaysia, 2006)

Biodiversity allows for ecosystems to adjust to disturbances like extreme fires and floods. If a reptile species goes extinct, a forest with 20 other reptiles is likely to adapt better than another forest with only one reptile.
Genetic diversity prevents diseases and helps species adjust to changes in their environment. Simply for the wonder of it all, there are few things as beautiful and inspiring as the diversity of life that exists on Earth.

2.1 Threats to Biodiversity

Extinction is a natural part of life on Earth. Over the history of the planet most of the species that ever existed, evolved and then gradually went extinct. Species go extinct because of natural shifts in the environment that take place over long periods of time, such as ice ages.

Today, species are going extinct at an accelerated and dangerous rate, because of non-natural environmental changes caused by human activities. Some of the activities have direct effects on species and ecosystems, such as:

1. Habitat loss/ degradation
2. Over exploitation (such as overfishing)
3. Spread of Non-native Species/ Diseases
4. Some human activities have indirect but wide-reaching effects on biodiversity, including pollution and climate change

All of these threats have put a serious strain on the diversity of species on Earth. According to the International Union for Conservation of Nature (IUCN), globally about one third of all known species are threatened with extinction. That includes 29% of all amphibians, 21% of all mammals and 12% of all birds. If we do not stop the threats to biodiversity, we could be facing another mass extinction with dire consequences to the environment and human health and livelihood

Up till about 100 years ago, most of Malaysia was covered by natural forests. The most rapid changes to the natural ecosystems had been in the last 50 years or so, when Malaysia embarked on a policy of rapid economic development. Parts of lowland forests which were suitable for agriculture were converted to commercial rubber and oil palm plantations as well as for other crops. As a result of the loss of their natural habitats, over collection and hunting as well as pollution, some species of plants and animals in Malaysia are considered endangered. However, Malaysia had been aware of the problems of the loss of natural habitats and environmental degradation resulting from economic development and has addressed these problems as early as 1975 and in the Third Malaysia Plan (1976-1980)

Threats to biodiversity in Malaysia include threats to ecosystems and species, such as land development, pollution, poaching and collection, encroachment, climate change and invasive alien species. While invasive alien species affect all sectors, based on past records, the agriculture sector has been most seriously affected in this regard. The main drivers of these

threats consist of economic growth, increased demand for food, agricultural products, goods and services, exotic wild meat, traditional and herbal remedies, wild animals for pets and wild ornamental plants. (biodiversity in malaysia, 2006)

2.2 Habitat Loss in Malaysia

Habitat loss due to destruction, fragmentation or degradation of habitat is the primary threat to the survival of wildlife in Malaysia.

When an ecosystem has been dramatically changed by human activities such as agriculture, oil and gas exploration, commercial development or water diversion, it may no longer be able to provide the food, water, cover, and places to raise young. Every day there are fewer places left that wildlife can call home. (biodiversity in malaysia, 2006)

The UN predicts that in 15 years, 98% of the rainforests in Indonesia and Malaysia will be replaced by oil palm plantations The deforestation of Borneo, Indonesia over time is depicted in Figure 2.0

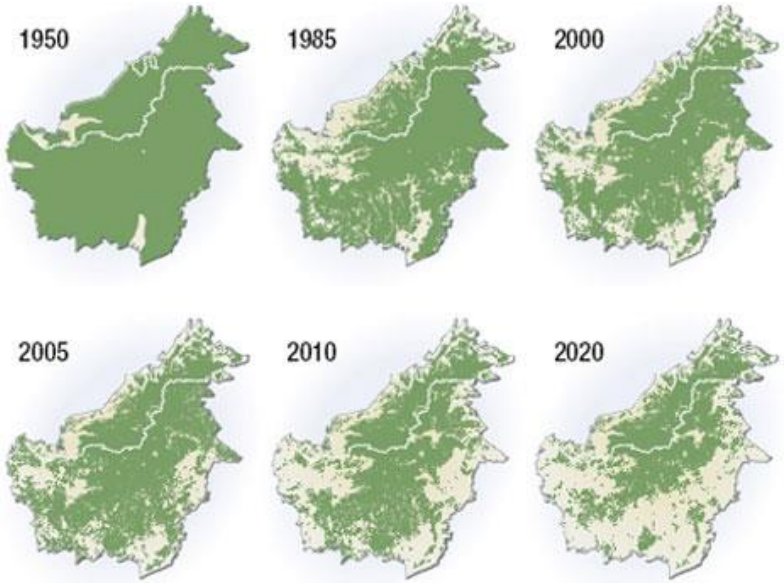


Figure 2.0/ The projection of forest loss in Borneo, Indonesia. (leannarose79, 2013)

2.3 Major types of habitat loss

1) Habitat destruction:

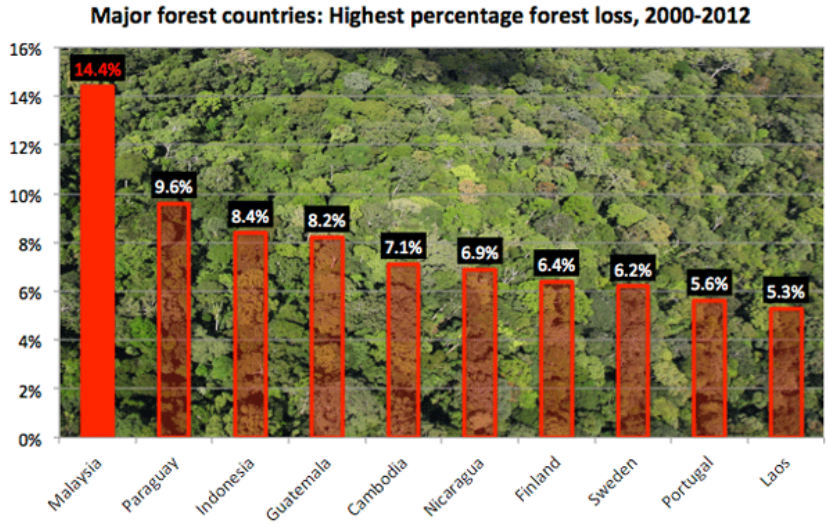
A bulldozer pushing down trees is the iconic image of habitat destruction. Other ways that people are directly destroying habitat, include filling in wetlands, dredging rivers, mowing fields, and cutting down trees.

2) Habitat fragmentation:

Much of the remaining terrestrial wildlife habitat in the U.S. has been cut up into fragments by roads and development. Aquatic species' habitat has been fragmented by dams and water diversions. These fragments of habitat may not be large or connected enough to support species that need a large territory in which to find mates and food. The loss and fragmentation of habitat make it difficult for migratory species to find places to rest and feed along their migration routes.

3) Habitat degradation:

Pollution, invasive species and disruption of ecosystem processes (such as changing the intensity of fires in an ecosystem) are some of the ways habitats can become so degraded that they no longer support native wildlife.



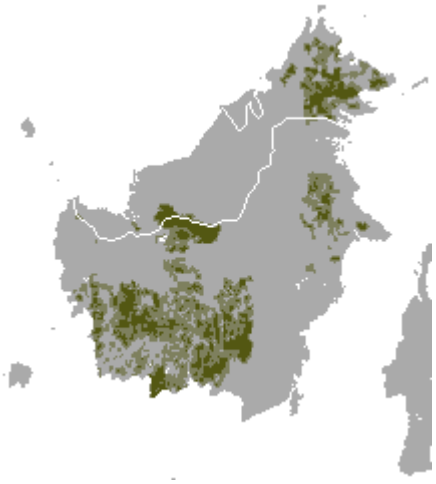
(Chu, 2013)

3.0 Threats to Orang Utan and solution

Habitat loss occurs when human activities result in the conversion of natural ecosystem into a more human dominated system. For example, there have been many issues of company cutting trees to either build a large building causing the animals to find their new habitat or worse suffer from habitat loss. The Orangutan, specifically Bornean Orangutan have been declined by their number of population since the middle of 20th century. Since Orangutan is one of Malaysia own mammal to be proud of. These species are now one of the endangered species as of right now especially in Malaysia.

The orang utan is one of the great apes that is facing extinction largely due to loss of their natural habitats and hunting pressure. In Sabah, one estimate is that there are only 5,000 to 10,000 of orang utans left, mainly concentrated in forests along the Kinabatangan River.

Orangutan could only be found in the rainforests especially on Borneo; they also are more comfortable to live in trees and are not exceeding the 500 metres mark. However, with their species being endangered it is more likely due to their habitat. There are many precautions that could be taken out to keep this animal safe and live longer so that the young generations of Malaysia could witness this unique extant of great apes.



Habitat of orang utan in Borneo

3.1 Conservation of the Orang Utan in Malaysia

Sepilok Orangutan Rehabilitation Centre is located in the Sabah District of North Borneo. Founded in 1964, their main goal is to rehabilitate orphan Orangutans with the centre protected to keep any illegal hunters out of their harm way. It, was established to help the conservation of the orang utan displaced by habitat destruction and hunting. Although orang utans are fruit eaters, there is recent evidence showing that they are adapting their diet and eating a larger amount of leaves in logged-over forest areas of Kinabatangan.

They are mainly found in the Batang Ai National Park and the Lanjak Entimau Wildlife Sanctuary. An orang utan rehabilitation centre was also established in Semengoh near Kuching to rehabilitate orang utans for eventual reintroduction back to the forest.

Figure 1.1 Shows the Sepilok Rehabilitation Centre (Daines, 2015)

With Sepilok Centre the Bornean Orangutans are much safer from illegal hunter that hunts and sell them to the black market, which also cause them to be in fear and to find their new habitat for safety. The demands for younger orangutans are very high for pet trade in an illegal manner. Even though if the government tried to stop it, they will still slip and illegal activities will be running as usual. So the solution for these Orangutans is to conserve their habitat and themselves in order to save them from extinction. There are currently around 45,000-69,000 populations of Orangutans. “The organization ‘WWF’ has work with the governments, local communities, plantation owners and indigenous Dayak people to help develop plantation methods that could affect their habitat in any way.” The statement by the WWF stated that they do not only speak up about the issues but also give helping hand to the people who care about the Orangutans for them to live their life normally and not in danger.

In conclusion Orangutans is the gem of Malaysia because they could only be found in Borneo and Sumatra rainforests, it is also our responsibilities that we take care of them with all

the percautions needed to make sure they are safe from hunter which could cause their loss of habitat. They are many solutions to help the Orangutans to be safe such as the Sepilok Centre where they conserve the Orangutans and their habitat. While people like us could rise awareness to how little population the Orangutans is and how important they are to our country.

3.2 Why Orang Utan matters in our living?

There are benefits to Orang Utan to not be extinct in Malaysia. Surely there are reasons to save this species and it is common that these animals have some sort of helping hand to nature. One of the key reasons why Orang Utan should be saved is that as most of the fruit eating primate, they help forest regeneration as it disperses seeds which help regenerate more fruit trees throughout the rain forest. This also keeps the rain forest to be healthy as well as their own habitat healthy. Also a sign to see how well and unsustainable the forests have been is the reduction number of population of Orang Utan. Since they are decreasing less work to keep the rain forests diverse and healthy are beginning to become an issue. Not only it help the ecosystem by regrown fruit trees this species is also important, without them it signals the disappearance of other thousands animal and plant species in a fragile tropical forests. So conversely by saving Orang Utan not only you save an endangered species but you also save the other animals and plants that are in need of their existence. (worlwoldlife)

4.0 Threats to Malayan Tiger / Tiger of Malaya and solution

Figure 1.0 shows a picture of the Malayan Tiger

The Malayan tiger is the national animal of Malaysia. Two tigers are depicted as supporters in the coat of arms of Malaysia, and the tiger appears in various heraldry of Malaysian institutions such as the Royal Malaysian Police, Maybank, Proton and Football Association of Malaysia. It symbolises bravery and strength to Malaysians. It is also the nickname for the Malaysian national football team. The tiger has been given various nicknames by Malaysians, notably "*Pak Belang*," which literally means "Uncle Stripes." *Pak Belang* features prominently in folklore as one of the adversaries of Sang Kancil (the mouse deer).

Figure 1.1 shows a picture of the Royal Malaysian Police badge
Figure 1.2 shows a picture of Maybank logo
Figure 1.3 shows a picture of proton logo

The Malayan tiger also known as the 'Tiger of Malaya' is a tiger subspecies that inhabits the southern and central parts of the Malay Peninsula and has been classified as an endangered species by the International Union for Conservation of Nature in 2008 as the population was estimated at 493 to 1,480 adult individuals in 2003.

When in 1968, the Malayan tiger was newly designated, the tigers inhabiting the Malayan Peninsula were included into this subspecies. In 2004, the tigers were recognized as a new subspecies when a genetic analysis found that they are distinct DNA and micro-satellite sequences from the Malayan tiger.

When the tiger population of the Malay Peninsular was accepted as a distinct subspecies in 2004, the chairman of the *Malaysian Association of Zoos, Parks and Aquaria* argued that the new subspecies should be named *Panthera tigris malayensis* to reflect the geographical region

of its range. As a compromise, it received the vernacular name "Malayan tiger" and the scientific name *Panthera tigris jacksoni*, which honours the tiger conservationist Peter Jackson. (malayan tiger)

There is no clear difference between the Malayan tiger and the Indochinese tiger when specimens from the two regions are compared cranially or in pelage. No type specimen was designated. The Malayan tigers appear to be smaller than Indian ones. From measurements of 11 males and 8 females, the average length of a male is 8 ft 6 in (259 cm), and of a female 7 ft 10 in (239 cm).

Malayan tigers prey on sambar deer, barking deer, wild boar, Bornean bearded pigs and serow. Tigers also prey on sun bear, young elephants and rhino calves. Whether their principal prey includes adult gaur and tapir is unknown. Occasionally, livestock is also taken; however, tiger predation reduces the numbers of wild boar which can become a serious pest in plantations and other croplands. Studies indicate that in areas where large predators (tigers and leopards) are extinct, wild pigs are over 10 times more numerous than in areas where tigers and leopards are still present.

Figure 1.4 shows a tiger attacking a cow

4.1 Conservation of the Malayan Tiger in Malaysia

Logging operations and the development of roads pose a big threat to Malayan tiger habitats. Conversion of forests to agriculture or commercial plantations results in frequent encounters between tigers and livestock. The cost for farmers can be high—livestock loss due to tigers is estimated to have cost more than $400,000 from 1993-2003 in Terengganu, one of the poorest areas in Peninsular Malaysia. In retaliation, tigers are often killed by authorities or angry villagers. Tigers killed as “conflict” animals often end up on the black market, creating a link between human-tiger conflict and poaching.

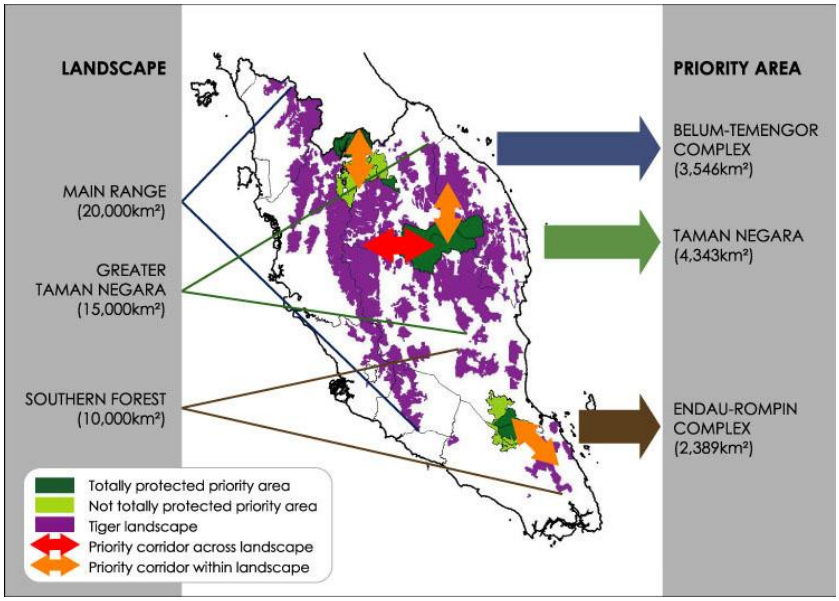


Figure 1.6 shows the habitat of the Malayan Tiger

4.2 What are the World Wildlife Fund for Nature (WWF) in Malaysia doing to prevent the extinction of the Malayan Tiger?

1) MITIGATING HUMAN-WILDLIFE CONFLICT

WWF has led an initiative to reduce human-wildlife conflict through better livestock management. By helping farmers build more secure cattle sheds, livestock predation by tigers has been significantly reduced. WWF also managed to reverse a 2002 decision by a Malaysian state government to eliminate all tigers.

2) LAND-USE PLANNING AND MANAGEMENT

WWF helps state governments make tiger-friendly planning decisions. In addition, we work on management of High Conservation Value Forests in order to ensure protection of tiger habitats. WWF helps the government of Malaysia site and develop wildlife corridors to maintain connectivity between forest areas with the construction of roads.

3) TIGER RESEARCH

WWF has helped set up camera traps to monitor tiger populations and other wildlife. These surveys help us measure Malayan tiger populations and understand their habits.

4) COMMUNITY OUTREACH

WWF knows that for tigers to survive, local communities must understand the importance of tiger conservation. Our education efforts include comic books describing how to avoid human-tiger conflict and a website developed for children.

4.3 Tiger Conservation in Endau-Rompin landscape of Peninsula Malaysia

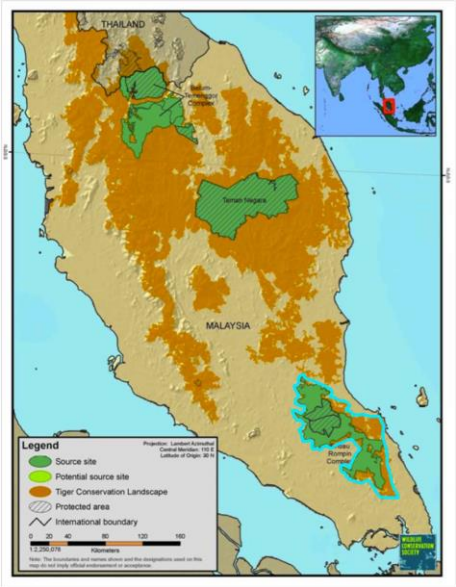


Figure 1.8

Figure 1.8 shows 3 main landscapes for the conservation of the Malayan tigers in Malaysia, Belum-Temenggor in the north, Taman Negara in the center and Endau-Rompin in the south

In Peninsular Malaysia wild tigers now persist primarily in three main landscapes; Belum-Temenggor in the north, Taman Negara in the center, and Endau-Rompin in the south. Each of these three landscapes has the potential to hold approximately 100 tigers at their natural carrying capacity. However due to poaching of tigers, poaching of tiger prey and habitat degradation, the number of tigers in each of these landscapes is below their carrying capacity.

Figure 1.9 shows a tiger being killed by poachers

There are three main direct threats to tigers in the Endau-Rompin landscape: habitat loss in key corridor areas, direct killing of tigers by poachers (figure 1.9), and killing of tiger prey by poachers. To address these threats WCS-Malaysia works closely with the state and federal governments of Malaysia to undertake the following interventions: tiger-friendly land-use planning in the key corridor areas; a robust, continuous, on-the-ground anti-poaching effort

across the whole Endau-Rompin landscape; outreach with local communities living in and adjacent to the Endau-Rompin landscape to support the anti-poaching work; and regular monitoring of tiger and tiger prey population numbers to determine if the conservation efforts are successful. All of these interventions are ongoing and will require steady funding over the long-term to ensure the recovery and then maintenance of the tiger population of Endau-Rompin.

Plan 1: Anti-Poaching Effort

The anti-poaching efforts of the WCS-Malaysia Endau-Rompin tiger conservation program consist of a couple main activities. The first is catalyzing and supporting on-the-ground ranger patrolling across the Endau-Rompin landscape. Some patrols are on foot in the backcountry, and some patrols are by vehicles and boats along all the major and minor roads and rivers of Endau-Rompin. Along the access points to Endau-Rompin WCS and the Government of Malaysia also employ moveable roadblocks and static checkpoints as further means of deterring the high number of relatively less-committed, minor poachers and capturing the smaller number of more committed, high-value poachers. Dismantling illegal snares is another major activity of the anti-poaching teams.

Plan 2: Education and Outreach

The education and outreach component of the WCS-Malaysia Endau-Rompin tiger conservation program consists of a few main activities. The first is extensive formal and informal engagement and conservation education activities with adults and children in the villages throughout the landscape. The main purpose of this engagement is to increase the acceptance of all the tiger conservation activities happening in the Endau-Rompin landscape. Such engagement can also lead to identifying new staff.

4.4 How can the Malayan Tiger help in our built environment?

There are as few as 250-340 tigers left in Malaysia, we have to act now or this iconic animal in Malaysia would extinct in less than 20 years. Being one of the strongest animals in the forest, the Malayan tigers shape the ecosystems in which they live. They prevent over-grazing by limiting herbivore numbers and maintain ecological integrity. Also, they are solitary and have large home ranges making them excellent ‘umbrella’ species providing space for a variety of other species to flourish. Taking an example of another country, which is India, more than 350 rivers originate from tiger reserves. These reserves also sequester carbon, provide oxygen and slowly release ground water to regulate floods. Furthermore, protecting the Malayan tiger will in turn protect these vital habitats. Also, protecting existing tiger habitats and the reforestation of degraded habitat may help buffer the poorest communities in Asia against the impacts of river siltation and flooding, while providing global benefits. Last but not least, saving the Malayan tiger will help communities and local populations benefit from habitat resources and tourism. We, the people, is solely responsible for the killing of the tigers in Malaysia and around the world. In the natural world, the tiger's only predator is man. We therefore must act to stop the killing and save the tiger in the wild to help keep a balance society and life cycle.

5.0 Conclusion

The challenges of biodiversity conservation in Malaysia are many. In some aspects, Malaysia is fortunate because it is no longer a poor country and does not need to over-exploit its natural resources or harvest its resources unsustainably. The contribution of natural resources and the agricultural sector to the national economy has been important in the country's development. As the manufacturing and services sectors mature and increase their share to the country's economy, it has become less reliant on natural resources. Globalization introduces new challenges in terms of development strategies. According to some projections of technological trends, the coming decades will see the rapid development of biotechnology, much like the development of electronics and information technology of the last few decades. Malaysia has stated its intention of being in the forefront of this trend and to reap the benefits of technological utilization of its biodiversity. Thus there is a need to conserve and sustainably use its biodiversity assets in order to keep options open for future development. As the country progresses to become a developed nation by 2020, there is a need to define national priorities. The conservation of natural heritage, the improvement of environment, the enhancement of the quality of life would be important goals. The rich biodiversity in Malaysia is a natural heritage that Malaysia will hold in trust for people of the world. It is a responsibility and challenge that Malaysia will meet.

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